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H. M. OLMSTED — M. V. FULLER
MARTHA CANDLER
Associate Editors
HERBERT K. SAXE
Treasurer
PRENTICE C. FORD, Asst. to President — MYRON MacLEOD, Advertising Manager

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In THE MUNICIPAL INDEX (an 875-page annual volume published by American City Magazine Corporation) readers will find much material, including articles, lists and bibliographies on a wide variety of municipal and civic subjects, not published in the monthly issues of THE AMERICAN CITY.

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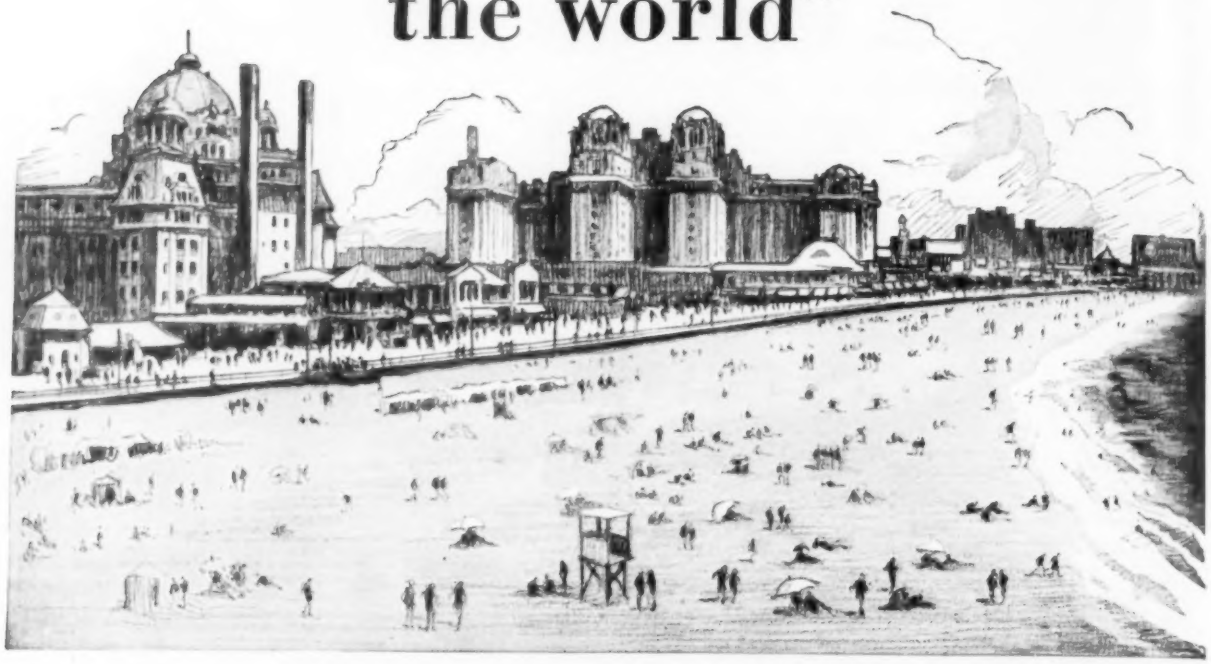
At "the playground of the world"



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"About 7 years ago we started using cast iron pipe made by the deLavaud centrifugal process. This pipe proved so satisfactory that we are using it exclusively in all obtainable sizes." Thus writes Mr. L. Van Gilder, Engineer and Superintendent of the water department of Atlantic City, N.J.

Other cities in all parts of the country are aware of the efficiency and economy of deLavaud pipe. Springfield, Mass., Detroit, Michigan; Ft. Worth, Texas have purchased many miles of deLavaud Pipe for underground mains.

DeLavaud Pipe is produced by pouring molten iron into a rapidly revolving cylindrical mold. Centrifugal force holds the iron against the sides and drives out air bubbles and impurities with a force many times greater than gravity.

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Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Administrative Problems

Plan Now for Work Relief Next Winter

"I DO not know how long the present economic business depression is going to last, but whatever the industrial and business improvement may be, and I hope and pray it may be substantial, the conclusion is inescapable that unemployment relief will unquestionably be a serious problem in the fall and winter of 1931 and 1932 in almost every city. If I am wrong in this conclusion, I shall be the first to rejoice."

With these words Herbert H. Lehman, Lieutenant-Governor of New York, sounded a precautionary note on June 12 at the annual banquet of the New York State Conference of Mayors and Other Municipal Officials, at Glens Falls, N. Y. He continued:

"I would like to see the cities now—this week if possible—plan for handling a situation which almost inevitably will face them within a few months. By advance planning, next winter's unemployment relief by municipalities and private philanthropy can be made both more effective and less costly. The outstanding facts coming out of this past winter's experience in caring for the large number in need due to unemployment, is the practicability and desirability of furnishing relief in the form of work. . . .

"Work relief can be made the principal means of giving aid to the unemployed, but cannot be organized effectively or economically on the spur of the moment when acute need is already upon the community.

"The advance planning of an emergency unemployment program can be done quietly and without unnecessary publicity. Carefully planned in advance, projects for city and private relief work can be speedily, effectively and economically put into effect, when and if needed.

"Granting of work relief will serve the dual purpose of relieving distress and of keeping up the morale of the unemployed. The alternative in many cases will be charity or doles, which are both socially and economically destructive. To give work relief, however, will require funds, and in many municipalities necessary funds will be available only if plans are made substantially in advance of the prospective need.

"It will be necessary to reduce for the time being unnecessary or non-productive expenditures in order to concentrate on necessary work, giving employment to the largest possible number.

"But planning, of course, should not be confined to the temporary situation of providing work relief. It should cover all governmental undertakings and be permanent in character. It should be employed in times of prosperity just as well as in adversity."

A notable step in the advance planning of public works occurred on June 16, with the completion of the Federal Employment Stabilization Board through the announcement by Secretary of Commerce Robert P. Lamont, Chairman of the Board, of the appointment of D. H. Sawyer, consulting engineer, New York City, as Director. The Board is the result of legislation sponsored by Senator Robert F. Wagner of New York, for the coordination of construction planning so that Federal and possibly state and municipal public works can be reduced or accelerated accordingly as the general economic situation is marked by activity or depression.

As this issue of THE AMERICAN CITY goes to press, the world economic situation is showing an optimistic trend; but, however enduring this may be, it cannot be expected to cure the ills of unemployment without concerted efforts, intelligent planning, and time, measured in months and years rather than days and weeks. As stated on June 25 by Homer Folks, Secretary of the New York State Charities Aid Association, before the convention of the New York State Association of Public Welfare Officials:

"The price of success is careful advance planning, beginning now. The bulk of the cost of unemployment relief will inevitably fall next year, as it did last, on the public treasury. There is nothing in the rather widely advertised plans of the Association of Community Chests and the President's unemployment committee which would justify any municipality in delaying or diminishing its plan for unemployment relief next winter."

Professions Taxed by Virginia Municipalities

A RECENT analysis of license taxes levied on professions and allied occupations by 72 cities and towns in Virginia shows that 40 professions are subject to such license requirements.

License taxes levied on a few of the most common professions are as follows:

Profession	Highest	Lowest	Average
Architect	$50.00	$5.00	$30.00
Attorney	50.00	5.00	20.00
Chiropodists	25.00	5.00	11.00
Chiropractors	50.00	5.00	27.00
Civil Engineers	44.00	5.00	18.00
Conveyancers	100.00	5.00	24.00
Dentists	50.00	2.00	18.00
*Oculists	50.00	5.00	26.00
*Opticians	50.00	5.00	22.00
*Optometrists	50.00	5.00	20.00
Osteopaths	50.00	5.00	26.00
Physicians	50.00	5.00	20.00
Surgeons	50.00	5.00	24.00
Surveyors	44.00	5.00	20.00
*Undertakers	100.00	1.25	28.00
Veterinary Surgeons	35.00	2.50	18.00

* Indicates that merchant's license is also required by some municipalities.

Undertakers and embalmers are taxed in a greater number of these municipalities than any other class. A few localities require a merchant's tax to be paid on all purchases in addition to the specific professional tax.

The next most popular subject of local license taxes is the dentist, followed in order by attorneys, physicians, veterinary surgeons, architects, civil engineers, opticians, surgeons and chiropractors. Practically all the common professions are taxed in the cities.

HAROLD I. BAUMES,
League of Virginia Municipalities.

Items for Mayors and City Managers

Recent City Manager Appointments

J. M. BUCKLEY, City Engineer of Pawhuska, Okla., was recently appointed City Manager of Pawhuska, to succeed S. P. Malone, whose resignation became effective June 1. Mr. Malone had been City Manager for the past seven years.

O. E. Carr resigned the city managership of Fort Worth, Texas, which he had held since 1925, to become the first City Manager of Oakland, Calif., on July 1. Mr. Carr has served continuously as City Manager in six different cities since his first appointment in 1914 as City Manager of Cadillac, Mich., receiving promotions from Cadillac to Niagara Falls, N. Y., to Springfield, Ohio, to Dubuque, Iowa, to Fort Worth, Texas, and to Oakland, Calif.

M. J. Hoffman, a local insurance agent, became City Manager of Maquoketa, Iowa, May 18, succeeding J. G. Thorne, who is now Manager of Utilities in Kewanee, Ill. Mr. Thorne had been City Manager since April, 1926.

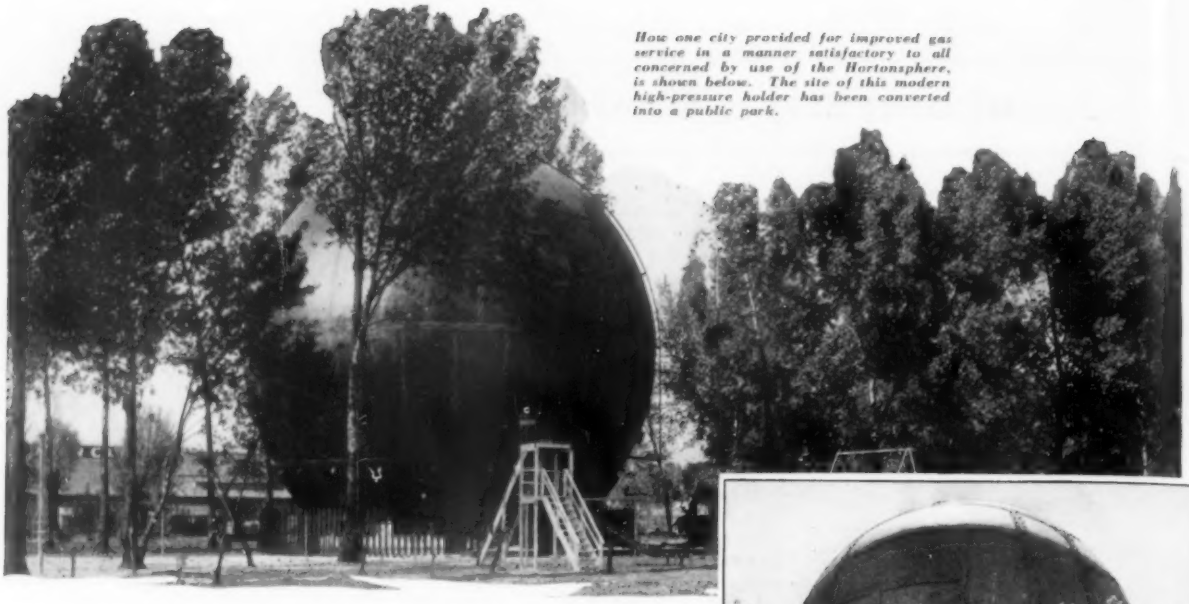
A. J. Koenig was selected from a list of fifty applicants to be the first City Manager of Fort Atkinson, Wis., effective June 15. Mr. Koenig received a master's degree in municipal administration in 1925, at the University of Michigan, was Assistant City Manager of Pontiac, Mich., 1925-28; and City Manager of Plymouth, Mich., 1928 to April, 1931.

R. Lee Mahaley, a local business man, was appointed City Manager of Salisbury, N. C., June 5, to succeed P. P. Pilcher, who had resigned to accept the city managership of Winchester, Va.

J. B. Pridgen, District Engineer for the North Carolina State Highway Commission, became City Manager of Charlotte, N. C., on June 1. He succeeds H. W. Rigsby, who resigned on May 6.

A. E. Taylor was appointed the first City Manager of Belton, Texas, on May 1.

CLARENCE E. RIDLEY,
Executive Secretary, The International City Managers' Association.



How one city provided for improved gas service in a manner satisfactory to all concerned by use of the Hortonsphere, is shown below. The site of this modern high-pressure holder has been converted into a public park.

A solution to the Problem of improved Gas Service - - -

CITY officials often find themselves between two fires when improvements and extensions of gas service are proposed. Appreciating the advantages of better gas service for the municipality, their natural inclination is to approve the necessary mains and gas-holders. Yet, such action may prove unpopular with property owners along a street to be torn up for new mains or near the proposed site of a large gas tank.

When confronted with a problem of this kind, many cities have found that the high-pressure gas holder, known as the Hortonsphere, offers a happy solution for all concerned. The numerous advantages of this modern gas container appeal to gas companies as well as to the public.

The small size of the Hortonsphere—ordinarily one-third that of a low-pressure holder of equal capacity—and its pleasing spherical shape minimize objections from property owners. By landscaping and painting, it can be made attractive in appearance. One city made a playground, shown above, of the property adjoining the tank. In other cases the holder has been practically concealed by the planting of trees and shrubs.

Making better gas service available by use of the Hortonsphere is proving successful in large and small cities throughout the country. It not only solves the city officials' problem, but also enables gas companies to effect savings in investment and operating costs.

The Hortonsphere is a spherical tank for the storage of gas under pressure. Ordinary sizes are 30 to 60 feet in diameter—about one-third the size of the average low-pressure holder of the same capacity. It is filled during off-peak periods when the gas demand is low, and feeds gas back into the system as it is needed.

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Birmingham	1502 Fiftieth St., N
Dallas	1206 Burt Bldg.
San Francisco	1033 Rialto Bldg.
Seattle	4343 Smith Tower
Houston	1101 Electric Bldg.
Tulsa	2425 Exchange Bank Bldg.
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For pressure storage of Gas

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Items on Water Supply and Purification

Supreme Court Ruling on Diversion of Water from Delaware River

ON May 4, 1931, the Supreme Court of the United States delivered an opinion on the suit by the state of New Jersey to enjoin the state of New York and the city of New York from diverting water from the Delaware River or its tributaries. The original plan was to divert 600,000,000 gallons daily for the water supply of the city of New York. The Supreme Court confirmed the report of the master, finding that the taking of 600,000,000 gallons daily would not materially affect the river, its sanitary condition or its use for municipal water supply, industrial, agricultural or shad fishing purposes, but that the amount should be reduced to 440,000,000 gallons daily, in view of the effect that the taking would have on the use of the river for recreation purposes and upon the oyster fisheries. The Court further directed that an efficient plant for the treatment of the sewage of Port Jervis, N. Y., should be constructed and that water should be released from impounding reservoirs in New York sufficient to keep the flow at Port Jervis and Trenton at 0.50-cubic foot per second per square mile of contributing area.

Preparing Fire Hydrants for Winter in Manitowoc

THE Public Utilities Commission of the city of Manitowoc, Wis., inspects its fire hydrants at least once a year. This is generally in the fall, before frost sets in. Particular attention is paid to leaky valves and to shutting off the hydrants properly so as to prevent breakage on account of freezing.

In several sections of the city, especially along the river and lake, the ground is very wet and it is necessary to plug up the drips on the hydrants to prevent surface water from seeping in. These hydrants have to be pumped out.

The Fire Department of the city also makes an inspection of the hydrants to see that the wrench nuts are in good order, that the nozzles are properly calked, and that the hydrants are in good operating condition.

E. C. SCHROEDER,
Manager, Public Utilities Commission.

Forrest City Plant Makes Improvements

TEN years ago the Water and Light Plant of Forrest City, Ark., was over $60,000 in debt, with a yearly income of only $20,000. During 1930, the receipts were $89,000, all debts are paid, and the plant has money in the bank. Two new oil engines have been installed, a new well 500 feet deep has been drilled, and the water mains have been extended one mile. The water supply of Forrest City is very satisfactory and plentiful.

CLIFFORD BARTON,
Manager and Superintendent.

Amounts and Costs of Mains Installed in Kenosha

DURING 1930, 4.47 miles of mains were constructed in Kenosha, Wis., adding 3.37 miles to the existing system and replacing 1.10 miles with larger mains. This brings the total mileage of mains up to 119.03. During the year, 175 water services were constructed and the same number of meters set for new consumers, bringing the total number of services up to 10,560 and of meters to 10,501. Sixteen new fire hydrants were installed during the year, making a total of 942 hydrants now in service.

The following table shows the amounts of various sizes of pipe installed during 1930, with costs:

Size	Length Ft.	Material Cost per Ft.	Labor Cost per Ft.	Total cost per Ft	Total Cost of Mains
6-inch	11,782	$1.09	$0.36	$1.45	$17,141 46
8-inch	1,381	1 64	1 46	3 10	4,288,03
12-inch	6,461	2 34	0.74	3 08	19,924 22
14-inch	312	4 20	3.16	7.36	2,295,73
20-inch	3,672	5 23	1.45	6 68	24,533 91
					$68,183 35

During the year, 1,965,636,000 gallons of water were pumped at the pumping station, 1,904,480,000 gallons of this being pumped through the distribution system. The coal consumed amounted to 2,848,441 tons, making 334 gallons of water pumped per pound of coal. Sulphate of alumina to the amount of 105.17 tons and 7,536 pounds of liquid chlorine were used.

P. J. HURTGEN,
Director of Public Works.

THE NEW 500-FOOT WELL AT FORREST CITY, ARK.

The Water Distribution of Oak Park, Ill.

THE village of Oak Park, Ill., receives its water supply from Lake Michigan through the water system of the city of Chicago, the principal connections being to the 24-inch main of the city of Chicago in Austin Boulevard at North Boulevard. From this intersection, connection is made by a 16-inch and a 20-inch main to the pumping station at Lombard Avenue and North Boulevard. From this point the water is distributed through the water system of the village. There are six emergency connections with the Chicago system at points along Austin Boulevard.

The pumping station is equipped with seven DeLaval pumps, two of 1,000-gallon-per-minute capacity, two of 2,000 gallons per minute, and three of 3,000 gallons per minute. These units are capable of delivering at the rate of 15,000 gallons per minute, or a 21.5-million-gallon rate per 24 hours. Water was pumped at the rate of 15,000,000 gallons per 24 hours on several days last summer for periods ranging from 2 to 4 hours. Of the three 3,000-gallon units, two are located in the pump pit, and pump direct from the 5,000,000-gallon reservoir supply.

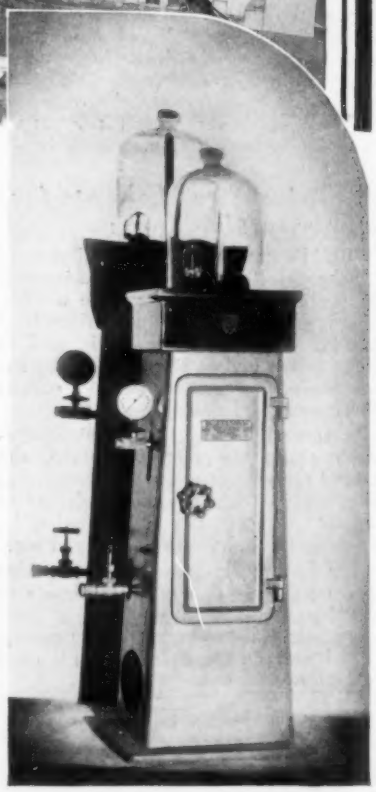
The piping arrangement at the pumping station is such that all pumps can draw direct from the supply as it is taken from the city mains, or can take supply from the reservoir. Owing to the work in connection with rearranging the supply lines to the station, transformers, etc., the 2,000-gallon unit recommended has not yet been installed. During 1930 all pumps were thoroughly overhauled and repaired. Energy is supplied to the pumping station over two independent underground circuits from the Oak Park and Maywood plants of the Public Service Company of Northern Illinois.

In the older parts of town, where the character of the property developed is changing, and in the locations where it is most necessary, 4-inch mains are being replaced with 6-inch and larger mains, in accordance with the recommendation of the National Board of Fire Underwriters. This work is being done by the Department and paid for out of the Water Department Fund as part of the water-pipe extension and improvement program. Fire hydrants have been installed in connection with the construction of the cross mains and in those blocks in which hydrants were not originally installed in the middle of the block.

DUDLEY C. MEYERS,
Superintendent, Water Department.

Dependable Chlorination

... Vital Link in the Chain of WATER SUPPLY



"NO STRONGER than its weakest link" no water supply can risk the all important job of chlorination to inadequate control equipment. Operation records of more than 3000 W & T Vacuum type chlorinators confirm vacuum technique as the most economical and dependable method of chlorination. • Developed for this exacting service of water sterilization W & T Vacuum chlorinators are the logical selection for swimming pool disinfection, sewage treatment and allied sanitary services. • Technical Publication 38 describes these chlorinators of unbroken records. A copy is yours for the asking.

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GEORGE H. FINNERAN
Supt., Water Service, Boston, Mass.
(Appointed 1927)
President, New England Water Works Association

J. P. McCOLLOUGH
Water Commissioner
Holdrege, Nebr.
(Appointed 1923)

BEN G. DAVIS
Supt. of Water
Rawlins, Wyo.
(Appointed 1924)

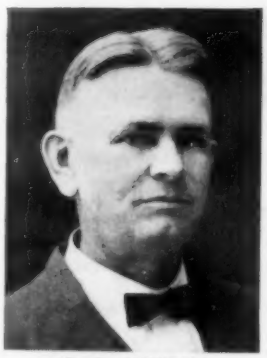
F. M. MERRITT
Water Commissioner
Chadron, Nebr.
(Appointed 1922)

LEO MEADOWCROFT
Supt., Water Works
Evanston, Wyo.
(Appointed 1917)

Who's Who in Water Supply

The 42nd of a Series of Portraits of Water Works Officials Which Has Appeared Monthly Since January, 1928

WILLIAM CHESTER WOMACK
Supt., Water Works
McMinnville, Tenn.
(Appointed 1928)



B. F. CHERRY
Mgr., Texas Public Utilities Corp., Weatherford, Texas
(Appointed 1911)

J. L. GOANS
Supt., Dunbar Water Works Co.
Dunbar, W. Va.
(Appointed 1921)

C. C. ELLIOTT
Supt., Water Dept.
Norton, Va.
(Appointed 1930)

J. S. PHILLIPS
Water Superintendent
Weslaco, Texas
(Appointed 1927)

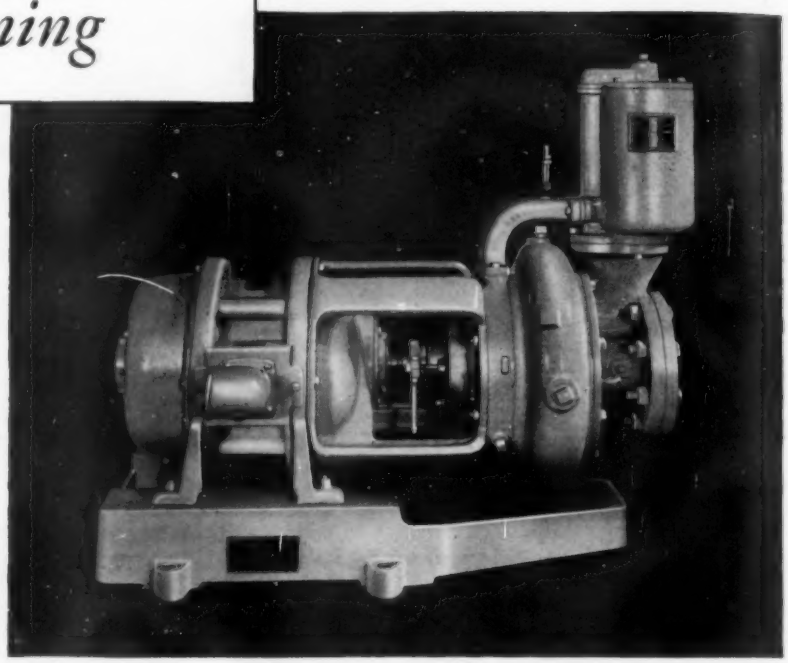
C. A. DAHLE
Supt., Water Works
Stoughton, Wis.
(Appointed 1931)

ALONZO H. GRINDLE
Supt., Water Works
Bar Harbor, Maine
(Appointed 1895)

C. L. McLEAN
Supt., Water Dept.
Lawrenceburg, Tenn.
(Appointed 1927)

FRED COWELL
Supt of Utilities
Pryor, Okla.
(Appointed 1931)

TAKES THE DIRTY WORK *out of inspection and cleaning*



Jennings Suction Sewage Pumps are furnished in capacities and heads to meet all the usual requirements. For complete information, write for Bulletins 113 and 124.

THERE is no dirty work connected with getting at a Jennings Suction Sewage Pump for inspection or cleaning. Never any need to open the pit cover or climb down into the pit.

The only submerged part of a Jennings is the suction pipe. Everything else is installed outside the pit, always within easy reach from the floor.

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Sewage Treatment Means Clean Streams

SEWERAGE and SEWAGE DISPOSAL

Solving the Sewage Disposal Problem of a Small Community

THE Jackson County, Mo., Farm, is in effect, a small municipality of 1,000 aged people supported and controlled by the county. Its location is some 10 miles from the city limits of Kansas City, Mo., and about half that distance from the nearest existing sewer system.

The farm comprises 380 acres of very rugged land, the difference in elevation between the lowest and highest points being about 130 feet. On the highest points of two hills 3,500 feet apart are located, respectively, the quarters for negro and for white inmates of the Farm. Between the two hills is a comparatively deep ravine. Drainage slopes away from both quarters in all directions, but wastes from the farm must travel through intermittent stream beds from 1½ to 3 miles before reaching the river.

The original plan of treatment was to pass the sewage through small septic tanks before discharging in a ravine nearby. These tanks were insufficient in size and in later years were completely by-passed, since the treatment was entirely ineffective.

A progressive administration in Jackson County sought to eliminate the insanitary conditions, and an outfall sewer was built under great difficulties at a cost of $25,000. The sewer is 6,530 feet long, with 622 feet of its length supported on a trestle crossing a ravine at a height of 20 feet. The average trench excavation was 12 feet, and more than 700 cubic feet of rock was removed.

The treatment plant is an activated sludge plant of the mechanical aeration type, producing an effluent which is satisfactory for disposal in a dry drainage ditch. The plant consists of a screen chamber, a preliminary settling basin, two aeration tanks, a final clarifier, a sludge pump station, a sludge digestion tank and a sludge drying bed.

The sludge digestion tank in which the activated and raw sludge is stored is a circular storage tank in which digestion of the organic solids occurs, the principal final products of digestion being stable humus-like matter and methane gas, neither of which has any pronounced odor. Sludge will digest or become stable in about six months in this digester. The digested sludge is drained from the bottom of the tank to the sludge drying bed, which has a system of underdrains beneath a layer of sand. The dried sludge is easily scraped from the sand beds and may be deposited as fill or garden soil, or used as a fertilizer.

The cost of the plant was $30,000. It is designed to care for an ultimate population of 2,000 inhabitants and requires only intermittent attention for oiling and caring for the machinery.

The consulting and designing engineers were Burns & McDonnell Engineering Co., and the general contractor was the Merkle Contracting Co., both of Kansas City, Mo. The aeration equipment was furnished by the Simplex Co., of Chicago, and the pumps and clarifier mechanism by the Dorr Co., of New York.

R. E. McDONNELL,
Burns & McDonnell Engineering Co.

U. S. Public Health Service Studies Stream Purification

THE Illinois River, heavily polluted by the sewage and stockyard waste from Chicago, was used by the United States Public Health Service for a study of the effect of microscopic organisms on nature's methods of purification of streams. Approximately 1,000 weekly samples, collected at every season and including all sections of the river, which is nearly 300 miles long, were analyzed and studied. Particular information was sought relative to the abundance of such organisms as thrive in sewage-polluted water and their gradual replacement downstream by organisms known to require water of a better grade. The gradual purification of the stream was thus expressed in terms of the prevalent kinds of microscopic organisms, both plants and animals, collectively known as plankton. The relative abundance of microscopic green plants was a matter of interest, as these plants help to purify the water by the oxygen they give off.

The results of this study indicate the following changes as the water progresses:

1. The swift upper portion of the river, heavily polluted but thoroughly mixed, is well seeded at the start with microscopic organisms from the tributary Des Plaines River and from Lake Michigan.

2. Gradually decreasing velocity distributes the suspended matter over a very large total area of bottom downstream, facilitating biological action.

3. The grayish water becomes clear and loses its odor of sewage 70 or 80 miles downstream from the Chicago Drainage Canal outlet.

4. Correlated changes in the plankton content are: (a) decrease of pollutional organisms formerly predominant; (b) increase of organisms of the cleaner-water kinds, these becoming predominant, and maintaining this status thereafter; and (c) increase in relative abundance of microscopic green plants.

5. In all sections of the river and at all seasons, the microscopic green plants were decidedly more abundant, volume for volume, than were the microscopic animals.

6. Malorodous bottom sediments from the polluted upper Illinois River contained very large numbers of "sludge worms" and no gill-breathing insect larvae, whereas sediments from the lower portions of this stream were free of odor, contained very few worms and showed a variety of gill-breathing insect larvae.

A suitable background for the above study is furnished by eleven abstracts of similar studies made on other streams and on the Illinois River by various investigators. Public Health Bulletin No. 198, dealing with this study, contains a large amount of information relative to the Illinois River summarized in 54 tables and 18 graphs. There are also a number of photographs showing field conditions, and some photomicrographs of the more important plankton organisms.

Seattle's Intercepting Sewers

A CONTRACT for the construction of the Lakeside intercepting sewers, consisting of a trunk sewer, connecting sewers, storm-water outfalls, gate chambers, lateral sewer connections, side sewer connections, pumping plants, force mains and other necessary appurtenances, has recently been completed in Seattle, Wash, at a cost of $159,570.

This improvement extends approximately 4 miles along the west shore of Lake Washington and is the first unit of a comprehensive system which, when completed, will eliminate the discharging of sewage into this lake within the city limits. Because of the objection to sewage-disposal plants along the lake shore, on which are located a high-class residential district, a park boulevard and numerous parks and bathing beaches, the plan was adopted of constructing intercepting sewers to pick up the flow from the numerous outfalls discharging into the lake, with pumping plants placed at necessary intervals to elevate the sewage and discharge it into main trunk sewers with outfalls into the salt waters of Puget Sound.

Triple-strength vitrified clay pipe made by a local company was used, with precast bituminous compound joints, also developed by this company in cooperation with the City Engineer's laboratory. Accurately machined rings, slightly tapered, were provided, one ring placed inside the socket and one outside the bell end of the pipe, leaving an annular space between the ring and the pipe, which was poured with the hot compound. After cooling, the rings were removed, leaving the pipe jointed and ready to lay. When the pipe was laid, the precast joint material was swabbed with a priming solution to soften this immediate surface, and the joints were shoved together much as a cork is shoved into the neck of a bottle. While a good deal of the sewer was laid below water level, there was practically no infiltration.

R. H. THOMPSON,
City Engineer.

What price certainty in pressure regulators!

Pressure is power, and power to be used efficiently must be under control at all times. Anything short of adequate control is, of course, unsafe and wasteful. That is why MUELLER has taken such pains with the two pressure regulators shown here. While they are designed for different purposes, they represent maximum certainty of adequate pressure control at all times.

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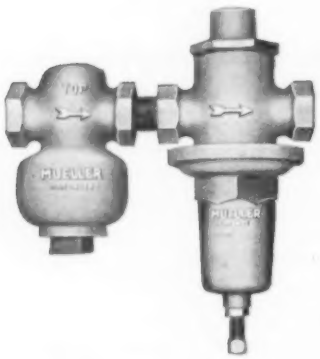

MUELLER Regulators provide ample protection where normal flow is required. Installed on pipe lines right after the meters, they prevent water waste, hammering and faucet splashing!

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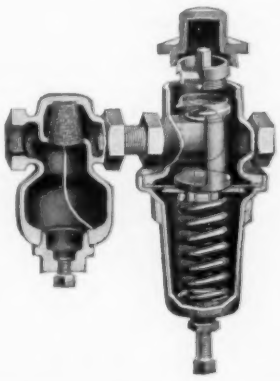
In comparative tests, ½-inch MUELLER Pressure Regulators passed as much water as some other makes up to 1¼-inch—more than twice the capacity. MUELLER-made and MUELLER quality in every respect. Free information gladly sent.



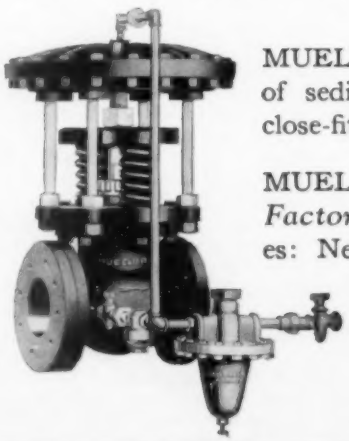
CONTROL HIGH PRESSURE HOT OR COLD WATER, AIR AND GAS!

MUELLER H-9020 Pressure Reducing and Regulating Valve is used extensively on district water services and industrial equipment.

It is finely made of iron with babbitt seat, navy bronze stem and working parts.

Elimination of Sediment Collectors

One of the conspicuous features of



MUELLER H-9020 is the absence of sediment-collecting pockets and close-fitting guide wings.

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Construction and Maintenance

Engineering and Highway Departments

Highway Maintenance Patrol Competitions

MOTOR patrol competitions are being conducted in each of the seven patrolling districts of the province of New Brunswick during the present season, under the approval of Hon. D. A. Stewart, Minister of Public Works. A total of $525 in prizes will be awarded, divided as follows: seven first prizes of $40 each; seven second prizes of $25 each; and seven third prizes of $10 each.

Awards will be made on the entire season's work and determined by recommendation from the engineers of the Department of Public Works. The basis of decision will value highway condition at 50 per cent, mechanical features at 25 per cent, and personal features at 25 per cent. Any patrolman not making a total of at least 50 per cent will be judged incompetent. —*New York Sun.*

Economical Separation of Grade Crossings

FATALITIES at grade crossings represent 84 per cent of the total number of fatalities on highways. It is estimated that there is one grade crossing for each mile of the 250,000 miles of railroad in the United States.

Estimated costs of overhead crossings of various materials built under favorable conditions, according to the plans prepared to accompany the estimates, are as follows:

Timber structure over single track	$ 4,469
Timber structure over double track with steel span	6,841
Steel structure over single track	8,073
Steel structure over double track	8,845
Concrete structure over single track	10,206
Concrete structure over double track	11,052

Dry excavation was estimated at from 40 to 92 cubic yards for each of these structures.

In making these comparative designs the abutments were designed as self-supporting on simply supported spans for the timber structures; in rigid frame designs for steel and concrete structures the support was at the top of the abutment in addition to the foundation, thereby reducing the amount of material required for the abutment. The estimates are based on bridges for 20-foot width of roadway.

Crossings of highways and railroads at grade are eliminated in one of two ways, either by the relocation of the highway or by the separation of the grades. The highway may be carried over the railroad on an overhead crossing, or it may be passed under the railroad by an underpass. The choice of crossing depends upon the topographic conditions and other restrictions encountered at the proposed location. Unless the conditions are such as to make an underpass necessary, it is generally more economical to use an overhead crossing, since the underpass must be designed for heavy railroad loads and the construction is more expensive because temporary structures must be provided to carry the traffic while the permanent structure is being built.

An overhead crossing consists of two parts, the main structure over the railroad tracks and an approach at each end of the structure. As the depth of the railroad cut over which the crossing is made increases, the amount of approach fill decreases until the depth of cut equals the clearance required between the tracks and the lowest members of the overhead structure.

In a rolling or rough country it is often possible to relocate the highway on each side of the tracks so as to cross at a railroad cut and thereby reduce the approach fills and the height of the supports at the end of the structure. The extent of relocation which is justified to accomplish this purpose depends upon the relation between the cost of relocation and the saving in approach fill.

In very flat country, where railroad cuts are light, it is generally advisable to build the structure near the grade crossing and construct approaches consisting wholly of embankments or partly of embankments and partly of trestles, depending upon the relative economy of the two types of approach. It should be kept in mind that, in flat country, the material for the approach embankments must be borrowed and additional land acquired for the purpose.

It is therefore evident that each grade crossing must be studied as a special case in order to decide upon the most satisfactory location.

MORRIS GOODKIND,
Bridge Engineer, New Jersey Highway Commission.

A Cure for Boils

THE Minnesota State Highway Department has been doing some interesting work near Morris, Minn., in curing frost boils. A Michigan power shovel first digs a hole in the ground for itself, and the dirt from this hole is hauled away. After that, the dirt in front of the machine is dug up and dumped directly in the rear, the work continuing as far as the frost-boil area extends. The fact that there is no tail swing to this type of shovel makes it possible to use it in the narrow quarters on work of this type.

A MICHIGAN SHOVEL PROGRESSING THROUGH A NARROW TRENCH IN WORKING IN A FROST-BOIL AREA

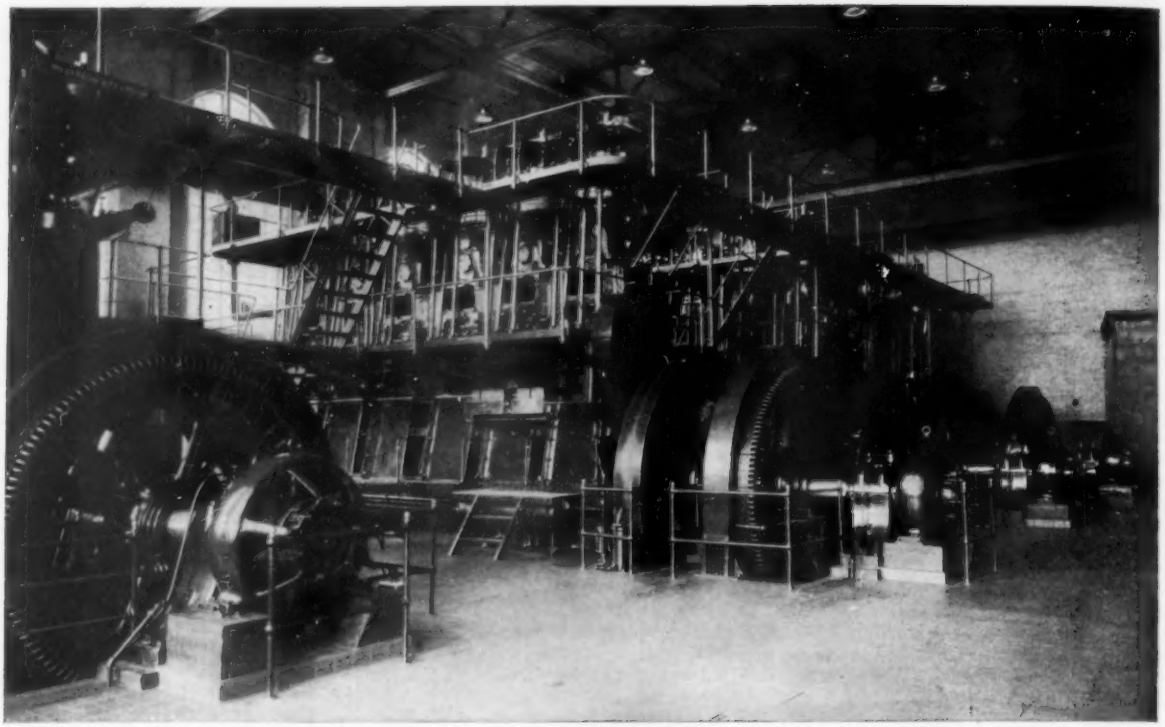
Salary-Cut Saving to Pay City Engineer

AFTER the City Council of Guthrie, Okla., had approved $2,400 in salary cuts recommended by Earl Geddes, City Manager, for water and police department employees, the Council reduced the Manager's salary $25 a month, increasing the saving to $2,700. The money saved is to be used in employing a part-time city engineer. Allen Walker, former County Engineer, was appointed City Engineer by the City Manager.

One Hundred Cities and Towns Have Adopted Welding in Building Construction

THE cities and towns in the United States which have adopted legal provision for the use of welding in building construction now total 100, according to Frank P. McKibben, of Black Gap, Pa., consulting engineer for the General Electric Company. Of this total, 90 have adopted welding in accordance with the Pacific Coast Building Officials Conference Code, six follow the American Welding Society's code, and four have adopted miscellaneous unclassified codes.

New Orleans is the largest city which has adopted a welding code, and the tallest all-welded structure in the country is the 19-story office building of the Dallas Power & Light Co., in Dallas, Texas. California has the largest number of cities and towns with welding codes, 67 having incorporated sections providing for welding. Oregon is second with six; Washington has four; Arizona, Louisiana and Texas have three each; New York and Massachusetts have two each; and Arkansas, Colorado, Montana, Nevada, New Mexico, North Dakota, Delaware, New Hampshire, Alabama and Mississippi have one each.



Three 1250-b.hp. McIntosh & Seymour Engines at Rockville Center. Generator at left driven by 840-b.hp. M. & S. unit

Rockville Center abandoned steam, bought three McIntosh & Seymour Engines, and within two years bought another 1250-b.hp. McIntosh & Seymour Unit

AFTER 30-year experience with steam operation, supplemented at times with purchased current, and after very careful investigation of power costs generally, Rockville Center, Long Island, retired its municipal steam plant and built the new all-Diesel station shown.

The initial Diesel installation consisting of two 1250-b.hp. McIntosh & Seymour Engines and one 840-b.hp. McIntosh & Seymour unit was put into service in 1928, with the anticipation that savings over production costs with steam would pay for the change-over complete within six years.

Operation of the three initial McIntosh & Seymour Diesel units proved so satisfactory that another of the larger size, 1250-b.hp., has already been purchased to raise the total plant capacity to 4590-b.hp., and is now in service as shown above.

Substitution of good Diesel engines for antiquated or inadequate steam equipment has proved the turning point between loss and profit in many ailing plants, and we gladly refer you to places where this change has been accomplished.

Let us submit operating and cost data on Diesel possibilities based upon your present conditions and needs.

Write for booklet "McIntosh & Seymour Diesel Engines for Municipal Plants"

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McINTOSH & SEYMOUR DIESEL ENGINES

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GUY KNEPPER
City Engineer
Carson City, Mich.
(Appointed 1925)

E. S. GLENN
City Engineer
Carthage, Mo.
(Appointed 1923)

GEORGE W. KORONSKI
Engr., Board of Road Commissioners, Gogebic County
Bessemer, Mich.
(Appointed 1930)

LAURENCE I. HALE
City Engineer
Ionia, Mich.
(Appointed 1920)

MAURICE E. MILLER
City Engineer
Salisbury, N. C.
(Appointed 1931)

Who's Who in City & County Engineering

One of a Series of Portaits of Engineering Officials Which Has Appeared Monthly Since April, 1928

S. B. DAMERON
County Surveyor, Rockingham Co.
Reidsville, N. C.
(Appointed 1908)

JOSEPH HILL ROWELL
City Engineer
Wakefield, Mich.
(Appointed 1927)

JAMES EDWIN TYSON
County Surveyor, Robeson Co.
Lumberton, N. C.
(Appointed 1916)

FRED KABLER
County Surveyor, Campbell Co.
Rustburg, Va.
(Appointed 1916)

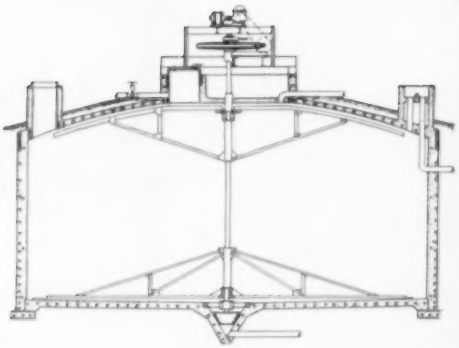
EDWARD H. RUEHL
City Engineer
Bluefield, Va.
(Appointed 1930)

GEORGE L. SULLIVAN
City Engineer
Santa Clara, Calif.
(Appointed 1929)

D. C. McMILLAN
City Engineer
Ventura, Calif.
(Appointed 1929)

CLYDE E. HEALY
Assistant City Engineer
San Francisco,
Calif.

F. D. RIDDLE
City Engineer
Caro, Mich.
(Appointed 1883)



The Hardinge Digestor With the Hewett Tank and Dome

The construction of a tank and dome to the Hewett method is economical and safe. By placing threaded bars with turnbuckles around the tank and dome and putting them in definite tension, the full value of the steel may be used. The steel is prestressed before the tank and dome load comes on it and compression is put into the concrete. **The concrete stays in compression at all times.**

Hewett tanks remain tight against internal pressure.

Contractors who have built this tank universally advise that a decided saving in cost is had over usual methods of constructing tanks.

The dome supports the mechanism and backfill load and eliminates auxiliary bridge superstructure.

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Conical Ball, Pebble and Rod Mills, Ruggles-Cole Dryers, Feeders, Thickeners, Rotary Tubular Conveyors, Sanitation Equipment

During July we hope you will remember to mention THE AMERICAN CITY

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

Garbage Collection and Disposal by Contract in Jamestown

THE city of Jamestown, N. Y., requires a complete separation of the perishable household wastes from that classed as rubbish, with separate collection of each. The perishable household wastes or garbage are drained and wrapped and collected weekly, except in the business section, where daily collections are made from hotels and restaurants. The garbage is hauled to a farm beyond the corporation limits and dumped in a field where hogs have access to it and eat a considerable part of it. The papers are burned, and what remains of the garbage is plowed under, checking unpleasant odors and contributing to the fertility of the soil.

The rubbish is taken to a city dump, the combustibles burned, and the rest used as fill. Ashes are used to cover tin cans and other rubbish. The man in charge of the dump finds some things of value, which are retained as part of his compensation for looking after the dump.

The collection equipment is furnished by the contractor and consists of 2-ton and 2½-ton trucks with 4-yard boxes. The contract price for 1931 is $27,872, the contract having been awarded after competitive bids were received. The population served is about 47,000.

For the past eight years the collection of garbage and rubbish has been under the Department of Public Works and for many years prior to that time was under the supervision of the Health Department.

M. T. PATCHIN,
Office Engineer, Department of Public Works.

Collection Costs and Problems in Sioux City, Iowa

THE employees of the Department of Sanitation of Sioux City, Iowa, cover an area of 46 square miles, collecting garbage and refuse from over 20,000 homes twice each week, and in the congested area three times each week, with less than five justified service complaints each month. The unjustified complaints are due to householders' putting garbage or rubbish out too late or on the wrong day, or having their garbage or rubbish passed up for failing to comply with the rules of the Department. On the whole, the citizens are very considerate of the collectors and try to cooperate with the Department. On each route, however, there are some people who seem to think that the health and garbage collection rules are not made for them and who persist in using open containers, dumping garbage, rubbish and ashes on the ground, or failing to drain and wrap garbage.

Most cities in the Middle West make a charge of from 50 cents to $1.50 per month for garbage collection service, but this is not the case in Sioux City, where this service is rendered free of charge.

The following figures give some idea of costs for garbage and rubbish collection for the fiscal year ending March 31, 1931: 5,652 loads, or 16,956 cubic yards, of garbage were collected, and 10,178 loads, or 40,712 yards, of rubbish and ashes, making a total of 57,668 yards, or 26,288 tons, of material collected during the year. Dead dogs to the number of 1,825 were collected, 1,289 dead cats, 1 dead goat, 1 dead calf, 5 dead hogs and 43 dead rabbits. During the year, 56 justified and 121 unjustified service complaints were received, 342 dump inspections were made, 27 "No Dump" signs were put up, 547 miscellaneous calls were made, and 7 garbage vaults were condemned and removed.

The annual payroll was $49,994.35, and $161.39 was spent for gas and oil, $19.00 for supplies, $181.58 for auto expenses, and $459.62 for miscellaneous items, making a total expense of $50,815.94 for the year. This makes a cost of $1.93-1/3 per ton, 88 cents per yard, or 63½ cents per capita.

The State Law provides a tax of two mills for financing the work of the Sanitation Department, but this is inadequate, as at the present time it produces but $50,200 and part of this may be used for street cleaning, sprinkling and flushing. An appropriation of $45,000 was made for the year ending March 31, leaving a deficit to carry over to 1931. Under the law, funds cannot be diverted from other departments to the Sanitation Department, so it will be necessary to carry a deficit until such time as the tax levy is increased.

Many new homes are under construction in Sioux City at the present time, and the United States Census Bureau shows that the population is increasing at the rate of about 1,000 per year. Four route changes were made the first of April to take care of the increasing population, but another year will bring more changes and it will be necessary to add another team. This will mean a $2,300 increase in operating expense. Therefore, it is felt that something should be done to allow the city to grow and maintain the service demanded by the taxpayers.

W. H. CARRIGG,
Superintendent, Department of Sanitation.

Garbage Collection by Private Contract

GARBAGE collection and disposal in Ridgewood, Bergen County, N. J., is taken care of under private contract, one man handling the entire collection. He is required to pay a concession fee of $15 per wagon yearly and is under the jurisdiction of the Board of Health. The collection is handled by trucks, and all refuse, with the exception of garbage, is dumped in low spots and marshy ground throughout the town. The garbage is sold by the contractor to hog raisers for feed.

There has been some thought during the past year of an incinerator, but as yet nothing definite has been decided in the matter.

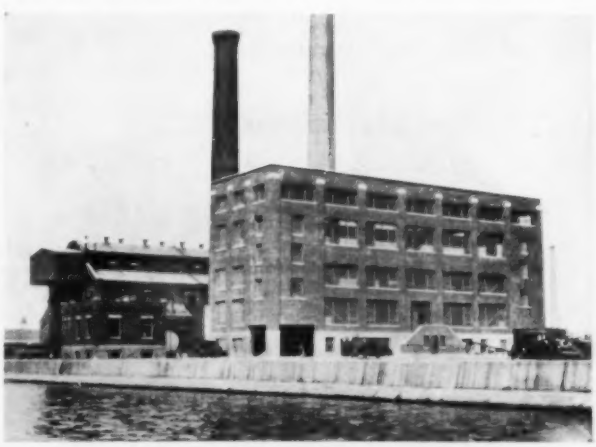
R. A. HARTOM,
Village Engineer.

Garbage Collected at No Cost to City

GARBAGE collection in Pueblo, Colo., has been done by hog feeders ever since the city has been large enough to justify it.

Previous to 1922, the town was divided into districts, and each district was allotted to a certain farmer or hog raiser for the collection of garbage. This did not prove satisfactory, and in 1922 a contract was given to one individual to gather the garbage of the entire city. He has equipped himself and is collecting the garbage at no expense to the city, feeding the garbage to hogs. His contract is renewed every two years, and this plan has been very satisfactory to date.

W. E. BUCK, M. D.
Chief, Department of Health, Inspection and Sanitation.



MILWAUKEE'S NEW 225-TON INCINERATOR, DESIGNED AND CONSTRUCTED UNDER THE DIRECT SUPERVISION OF P. M. JOHANNING, DEPARTMENT OF PUBLIC WORKS

UNDERGROUND EXPLOSIONS!

----but New

3-FOLD

FIRE ALARM BOX

protects

YOUR FIRE ALARM WIRES

A terrific sewer explosion has caused this street upheaval. Underground cables were broken as a result and many fire boxes of old styles put out of commission

Exploding gas in manhole has ripped up street and ruptured fire alarm and power cables. 3-FOLD principle of fire alarm transmission protects against this condition

Terrific explosions of gas accumulated from various sources in cable manholes and sewers, rupture all types of communication and power wires running below the streets in the downtown areas of every large city.

Fire alarm wires are no exceptions to the rule. A ruptured fire alarm cable almost inevitably puts a number of fire alarm boxes temporarily out of service, and therefore is likely to cause the loss of one or more important alarms upon which the safety of life and valuable property hinge.

The new 3-FOLD Principle of Fire Alarm Transmission, provided in the Gamewell 1931 PEERLESS 3-FOLD Fire Alarm Box, enables central office apparatus to be conditioned to receive alarms over broken or short-circuited fire alarm wires under many conditions, thus protecting your fire alarm system against loss of alarms following cable damage from manhole explosions or other accidents.

Let us send you a copy of our completely illustrated bulletin, describing this new box fully.

THE GAMEWELL COMPANY

NEWTON MASSACHUSETTS

"A BOX A BLOCK"

POLICE—SAFETY—TRAFFIC

Items for Departments of Public Safety

Model Legislation and Educational Work Reduce Traffic Fatalities

THE enactment of laws requiring drivers' licenses, compulsory inspection, financial responsibility, etc., such as have been recommended by the National Conference on Street and Highway Safety, has reduced traffic deaths as much as 25 per cent in some states, it was reported at a meeting of the Conference Executive Committee on June 23 at the National Automobile Chamber of Commerce. Representatives were present from the National Safety Council, United States Bureau of Public Roads, and national associations representing insurance, railroads, electric railways and manufacturing interests.

In view of the effect of educational activities in already lowering the number of motor accidents involving railroads and commercial vehicles, the Conference believes that the work during the next few years should bring a substantial reduction in the nation's annual highway fatalities.

It was agreed that the efforts of highway commissioners to provide safe highways, of traffic officers in standardizing traffic regulations, and of motor manufacturers in building safer cars, are contributing their share, but that there is still a great need for educating the pedestrian and the motor-vehicle driver. Stress was laid on the importance of educating high-school children who are now approaching the age when they will soon be driving motor vehicles.

The greatest progress in accident reduction during the past few years has been made in regard to children, the fatality ratio having steadily been decreased.

Educational methods were credited with having achieved a reduction of 50 per cent in the number of fatalities at railroad crossings since 1911.

The Conference was also encouraged by the success of driver-training programs for commercial vehicle operators, which were said to have resulted in a reduction last year of approximately 20 per cent in the number of accidents involving such vehicles.

During the 1931 legislative sessions, the number of states incorporating one or more of the four Acts of the Uniform Motor Vehicle Code has been increased to twenty, Colonel A. B. Barber of the United States Chamber of Commerce, and Director of the Conference, reported. In addition, fourteen other states have adopted legislation conforming in many respects to provisions of the Code. The Model Municipal Traffic Ordinance, also sponsored by the Conference, has been adopted by at least 38 cities throughout the country. Progress toward similar action has been reported in more than fourteen other cities.

Crime Prevention Bureau Created in New York

MAYOR JAMES J. WALKER on June 16 signed a bill for the creation of a permanent Crime Prevention Bureau in the Police Department of New York City. Such a Bureau was set up experimentally 18 months ago, and, according to Police Commissioner Edward P. Mulrooney, has been operated successfully and has already handled 7,000 cases.

The bill specifies that the new Bureau "be organized and maintained for the prevention of crime and delinquency among minors," and for performance of other duties to be assigned by the Commissioner of Police. It calls for the appointment of a sixth deputy police commissioner. Miss Henrietta Additon, who has directed the experimentally operated Bureau during most of the time for the past 18 months, has been named by the Mayor for this post.

A New Traffic Light Post for Fifth Avenue, New York

THE first permanent successor to the bronze traffic towers that formerly controlled traffic on Fifth Avenue, New York, has just been unveiled at 41st Street, in front of the New York Public Library. It is a post 10 feet high, cast entirely of bronze, with a heavy base for the control apparatus, and a slender shaft surmounted by the lights and a statuette of Mercury, god of speed. There will be over a hundred of these, two to an intersection from 8th Street to 59th Street. They were designed by Joseph H. Freedlander, the same architect who designed the former towers, and are being cast by the Reliance Bronze and Steel Corporation, of Brooklyn.

Municipal Provisions for Safety in Play

STRICT police protection for all playgrounds in St. Louis, including 58 public school summer playgrounds, will be given during the vacation season this year, according to an order transmitted by Chief of Police Joseph A. Gerk to all commanding officers of the Department. The safety of children on the streets—on their way to and from public parks and playgrounds, and in street games—is also stressed in the order as a police responsibility, and it is suggested that police officers obliged to break up street games should explain in a friendly manner their object in doing so, and should, if possible, assist in finding vacant lots as a substitute in neighborhoods where there are no playgrounds.

"Thousands and thousands of our children will be subjected to constant accident hazards and the department will be hard pressed to safeguard them," said the Chief's instructions. "However, it can be done, if we will exert ourselves, *and it must be done.*"

In San Francisco, the efforts being made to reduce street and playground accidents to children extend throughout the year. To quote from the *San Francisco Municipal Record* for June:

"With the increase in playground facilities throughout the city, the Playground Commission inaugurated a campaign to inform the parents and children of the dangers attending children that play in the streets. In addition to securing the cooperation of parents in having their children 'play in safety' on the playgrounds, the Department sought to extend the safety education to include playground children also.

"Statistics furnished by the Public Safety Department of the California State Automobile Association, emphasizes the importance of the 'play in safety' campaign. These statistics disclose that in San Francisco 27 children under 15 were killed by automobiles in 1926, 18 in 1927, and 22 in 1928. . . . The Playground Commission plans to continue its 'play in safety' campaign until parents will no longer knowingly permit their children to use the dangerous streets for playgrounds."

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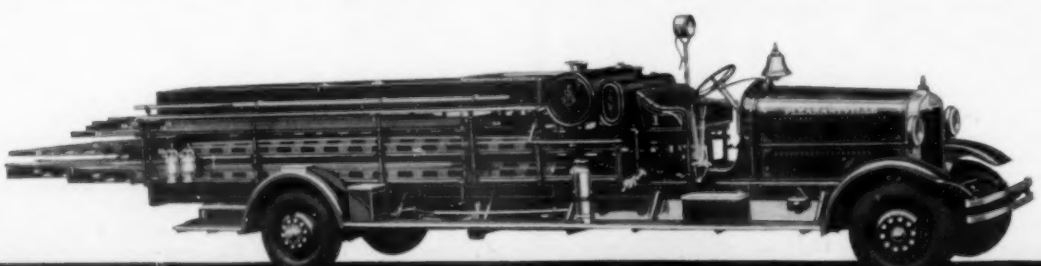

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CINCINNATI, OHIO

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G. O. EVANS
Fire Chief
Vincennes, Ind.
(Appointed 1926)

THOMAS J. MARTINSON
Supt. of Police
Hammond, Ind.
(Appointed 1930)

JOHN M. WEAVER
Police Chief
Elkhart, Ind.
(Appointed 1930)

SANDIFER FERGUSON
Fire Chief
Fort Worth, Texas
(Appointed 1927)

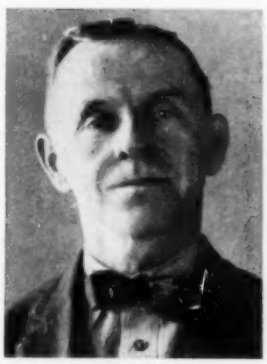
FRED ARMSTRONG
Police Chief
Terre Haute, Ind.
(Appointed 1930)

Who's Who in Public Safety

The 41st of a Series of Portraits of Fire and Police Chiefs Which Has Appeared Monthly Since January, 1928

A. McDONNELL
Police Chief
Webster Groves, Mo.
(Appointed 1922)

N. E. WASSON
Fire Chief
Huntington Park, Calif.
(Appointed 1930)



FRED FRANZ
Fire Chief
Tell City, Ind.
(Appointed 1930)

CARL H. LIPPINCOTT
Police Chief
Huntington, Ind.
(Appointed 1930)

J. H. SPECKHALS
Police Chief
Nebraska City, Nebr.
(Appointed 1930)

ORAL D. COX
Fire Chief
Noblesville, Ind.
(Appointed 1922)

FRANK E. CHAMBERLIN
Fire Chief
Chillicothe, Mo.
(Appointed 1927)

W. M. CLAIBORNE
Fire Chief
Logansport, Ind.
(Appointed 1930)

FRANK J. FESSENDEN
Fire Chief
Mt. Vernon, Ind.
Appointed 1930)

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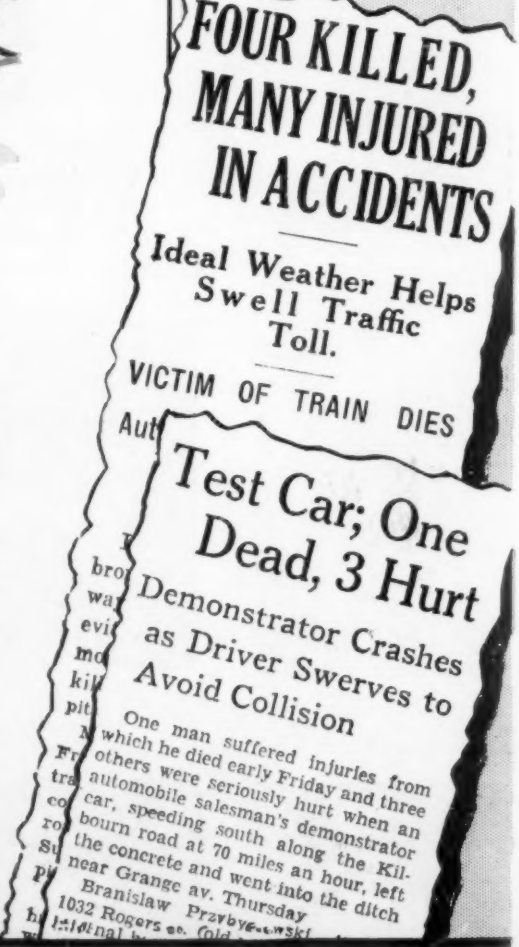
FOUR KILLED, MANY INJURED IN ACCIDENTS
Ideal Weather Helps Swell Traffic Toll.
VICTIM OF TRAIN DIES
Test Car; One Dead, 3 Hurt
Demonstrator Crashes as Driver Swerves to Avoid Collision
One man suffered injuries from
which he died early Friday and three
others were seriously hurt when an
automobile salesman's demonstrator
car, speeding south along the Kil-
bourn road at 70 miles an hour, left
the concrete and went into the ditch
near Grange av. Thursday
Branislaw Przybyszewski

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Motor fatalities are reaching shocking figures in nearly all cities—*except* those that employ adequate Safety Patrols of motorcycle officers.

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HARLEY-DAVIDSON
The Police Motorcycle

JULY, 1931

Vol. XLV, No. 1

The American City

470 Fourth Avenue
New York

50 Cents, $4 a Year

Fort Worth's New Fire Headquarters and Fire-Alarm Central Office

By SANDIFER FERGUSON
Chief of Fire Department, Fort Worth, Texas

EXPANDING from a population of 26,688 in 1900 to 163,447 in 1930, Fort Worth, Texas, experienced real growing pains—particularly during the past ten-year census period when the population increase was 53½ per cent.

Naturally, during such a rapid expansion in population, buildings of all types grew up everywhere and multiplied the fire hazards many times. Realizing the nature of these growing pains with regard to the Fire Department, City Manager O. E. Carr and the writer laid plans some months ago for extensive fire-department and fire-alarm improvements—one of the greatest fire-protection development programs that have ever been undertaken in the Southwest.

Two Thoroughly Modern Buildings

New fire-department headquarters and fire-alarm central office have just been completed along with several other improvements, which not only have provided the citizens with greater protection, but have also brought to the taxpayers an estimated annual saving in fire insurance premiums of $22,500.

The new buildings are of distinctive architectural design, and form a separate municipal group. They are of fire-resistive construction throughout, and furnished with the latest fixtures. The two structures are of reinforced concrete construction, with outside wall surface of face brick, and cast stone trimmings. The roof of the main building is of variegated tile, having red as the dominant color. The basement of the headquarters building contains the boiler room for both buildings. On the first floor are the apparatus room, the captain's office and telephone room, a living-room and main stair hall to the second floor, and two storage rooms. A paint room and a repair shop occupy a one-story portion. On the second floor are the offices of the fire chief, the fire marshal and

SIDE VIEW OF THE NEW HEADQUARTERS BUILDING

THE FIRE-ALARM OFFICE

the assistant chief. A bedroom and bath adjoin the chief's office, and there are two other bedrooms, with connecting bath. On this floor also are the gymnasium, dormitory, kitchen, bathroom and showers, storage room and drying room. The floor plans are based on the ideas of the writer.

Behind the apparatus room is the hose tower, rising to 64 feet above grade. The exit doors of the apparatus room are of the overhead type, operated by the wheels of the trucks. There is a setback of 47 feet from the curb line and a turning radius on the exit drive, such that we can turn the longest truck before reaching the center of the street. The building and equipment costs were as follows:

Item	Central Fire Headquarters	Fire Alarm and Signal Building
Land	$63,662	$21,581
Buildings	110,743	34,282
Plumbing	7,952	3,713
Heating	11,784	2,497
Electrical	3,367	825
Furnishings	4,715	300
Equipment fire alarm	398	71,184
Cable	....	38,241
New fire-alarm boxes	....	14,120
Miscellaneous equipment	....	30,440
Shop equipment	2,836	....
Totals	$205,457	$217,183

Total investment in improvements, $422,640.

Present Fire Department

The total value of Fort Worth's Fire Department, including land, buildings, and equipment, is $1,360,600. A total of 271 officers and men are employed in the Department, under the double-platoon system. Twenty-four companies occupy 21 fire stations and man 36 pieces of motorized apparatus. The present annual Fire Department budget amounts to $500,840, of which amount $450,120 is paid out in salaries.

In the Fire Department repair and paint shops four mechanics are constantly employed repairing and rebuilding apparatus. A well-organized drill school with first-class tower and equipment is maintained to assure the city of a well-trained Fire Department personnel. The Fire Prevention Bureau consists of a chief, four inspectors, and one arson investigator. This Bureau has done considerable to reduce the fire hazard in the city and has made arson very unpopular.

The new fire-alarm headquarters is of the same architectural design as the fire headquarters. It is also of fire-resistive construction, and isolated from any surrounding buildings of the combustible type.

Fire-Alarm System

The apparatus was designed, built, and installed by The Gamewell Co. and is the latest type of fire-alarm design. Below is a list of the central-office equipment:

- 3 20-ckt. floating battery switchboards
- 10 4-ckt. box line operating boards
- 2 4-ckt. primary alarm operating boards
- 2 4-ckt. secondary alarm operating boards
- 1 low current alarm set
- 1 60-ckt. protector boards
- 1 operator's pedestal of:
  - 2 Peerless transmitters
  - 2 8-ckt. multiple keys
  - Spring jack switches
  - 2 locking yoke telegraph keys
  - 1 4-ckt. Nonpareil register
  - 1 Excelsior time stamp
  - 1 60-ckt. box line frame
- 1 box line recording set of:
  - 10 4-ckt. Nonpareil registers
  - 10 Peerless take-up reels
- 1 primary and secondary recording set of:
  - 4 4-ckt. Nonpareil registers
  - 4 Peerless take-up reels
- 1 self-winding clock
- 4 90-inch 5-shelf metal battery racks
- 900 cells BTIS battery

Current is provided by means of a floating battery of 900 sealed-in cells of the BTIS type, connected to 56 low-rate rectifiers—one for each circuit.

Six high-rate rectifiers are also available for emergency use, should the battery fall below the regular charge for any reason. This is the first time that this feature has been built into an entirely new central office.

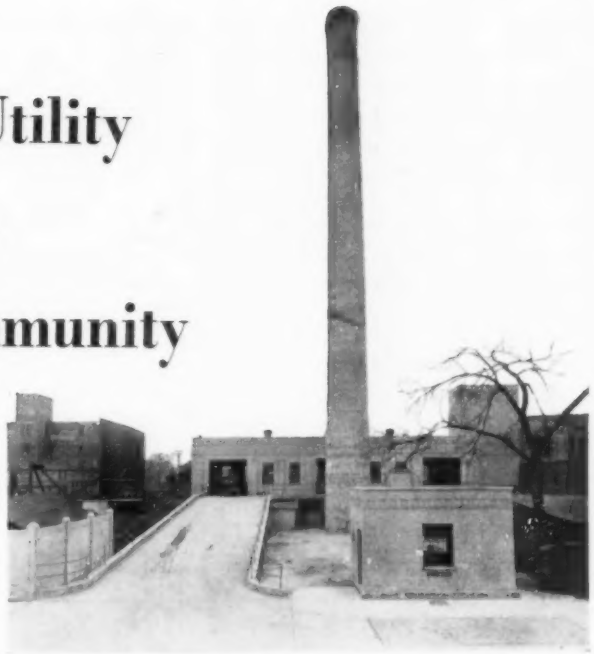
The present installation amply provides for any immediate expansion, and there is room for the installation of additional apparatus, should the future expansion be greater than anticipated.

Leading into the fire-alarm central office are 23 miles of underground cable and 70 miles of overhead fire-alarm wire, to which are connected 411 Gamewell street fire-alarm boxes. One hundred and ten of these boxes were installed new at the time the central office was placed in service. Forty-two of the existing boxes were also equipped with the latest quick-action doors, with the object of making the method of operating boxes uniform throughout the city.

Toronto tappers were installed and other improvements made in the alarm receiving and recording apparatus in the engine houses.

INTERIOR OF FIRE-ALARM OFFICE

Waste-Disposal Utility Keeps Pace with Growing Community



GENERAL VIEW OF THE OAK PARK, ILL., INCINERATOR BUILDING, RAMP, SCALE HOUSE, STACK AND PART OF THE STREET DEPARTMENT YARD

By **DUDLEY C. MEYERS**
Commissioner of Public Works, Oak Park, Ill.

IN the days when Oak Park was a village, in fact as well as in name, the matter of the disposal of waste material was comparatively simple; garbage was fed to the chickens or buried in the far corner of the back yard, ashes were used to fill in the low places in alleys, and miscellaneous rubbish was thrown into the vacant lot next door or across the street. But those days are gone forever. The chicken coop has been replaced with the modern garage, the back yard landscaped and planted as an outdoor living room; the alley has been paved and is known as a lane, and there are no vacant lots.

A 1½-TON FORD TRUCK AT THE PLANT LOADED WITH RESIDENCE DISTRICT WRAPPED GARBAGE

This load of garbage weighed 3,500 pounds and contained 5 cubic yards of material

For years, garbage, ashes, and other waste materials were disposed of by hauling to outlying sections of the village or to territory just outside the village limits. Gradually the opportunity for using these places became less. Unimproved property areas were built up, and adjoining communities objected to dumping within their city limits. This condition is one which is common more or less to all communities in suburban areas around Chicago, in fact, around all large cities. The situation gradually comes about where temporary means of waste disposal are eliminated and some permanent plan for disposal has to be found.

The First Incinerator

The situation in Oak Park became acute some years ago when the village was stopped from dumping garbage on land outside its limits. At that time, it was decided to build a garbage crematory. In 1907 a Lewis & Kitchen plant, costing $12,500 and with a rated capacity of 25 tons a day, was constructed in the center of the village within a half-block of the Municipal Building and the High School and in a residential district. This plant was designed to burn garbage only and required the use of coal. It functioned very well for twenty-two years and for the last five years burned 30 to 40 tons a day of garbage. It required about 100 pounds of coal per ton of garbage burned.

The plant, however, was being pushed far beyond its

UNLOADING A HORSE-DRAWN HIGHWAY TRAILER AT THE INCINERATOR

This load from a residence district contained wrapped garbage, combustible refuse, leaves and garden refuse. The weight of the load was 3,000 pounds and there was 6 cubic yards of material

capacity, and the condition of the building and furnaces was such that extensive repairs were needed to keep it in operation, and considerable delay was occasioned when garbage was brought to the plant, due to the fact that it was not large enough to handle the collections as they arrived at the building. The condition had also come about that the village was hauling all its waste, other than garbage, to a dump 8 miles outside of the village, paying $1.25 a load for dumping-charges; the total dumping-charges for the year 1929 being $14,234.85. Approximately 30 per cent of this waste was combustible material which could be burned if a suitable incinerator was available.

Growth of the Community

The village of Oak Park has a population of 64,000 and covers an area of 4½ square miles. Garbage is collected from 15,000 buildings, mostly one-family residences. The 110 miles of streets are paved, and practically all of the 50 miles of alleys are paved. Approximately 90 per cent of the property areas in the village are improved with buildings, and the village has been zoned as follows:

	Per Cent
Residence District "A"	74.18
Residence District "B"	13.52
Commercial	11.95
Industrial	.35

In 1925 the population of the village was 55,000, and in 1930 it was 63,982, but a large part of this increase in population has been in the area zoned for apartments and formerly occupied as one-family residences. Owing to this fact, the amount of garbage and other materials to be disposed of had not increased in proportion to the change in population. Large apartment buildings have installed their own incinerators and the village does not remove ashes from apartment buildings. The records for these five years show very little increase in the amount of garbage, ashes and other materials to be disposed of.

Steps to Secure New Incinerator

With the information available from the operation of the old plant and disposal methods, and with a knowledge of the character of the zoning and the probable development of the portions of the village not improved or where the character of the improvement would be changed, it was possible to make a fairly accurate estimate of the requirements of a new plant to take care of the present and future needs of the village.

On this basis and from information obtained by visiting various plants around Chicago and in other locations, tentative estimates and layouts were prepared by the Department of Public Works. In April, 1929, a bond issue

LOCATION OF THE INCINERATOR IN OAK PARK WITH RESPECT TO OTHER BUILDINGS AND RESIDENCES

in the amount of $200,000 for an incinerator was submitted to the voters and was approved. Final plans and specifications were drawn up by the Commissioner of Public Works and the Village Engineer. These plans and specifications were submitted to and considered by the Engineer's Advisory Committee and the Incinerator Plans Committee, which had been appointed by the Village President to cooperate and advise with the village officials in the consideration of plans for the incinerator and the letting of the contract.

The specifications for the incinerator plant were general. They covered the suggested arrangement of the plant on the property available and recommendations as to the general design and character of the building. The requirements were for a plant that would adequately and completely burn to a free ash or clinker refuse consisting of a mixture of garbage and rubbish which would average 65 per cent garbage and 35 per cent combustible waste, with a normal burning capacity of 10 tons per hour. The specifications also incorporated a statement of the amount of garbage being disposed of at the old plant and approximately the amount of combustible waste being hauled to the dump, and also a statement showing the amount and character of the equipment used for collecting garbage, ashes, rubbish, brush, leaves, etc. The specifications called for furnaces equipped with forced-draft fans, pre-heaters, ash-storage bin, scale-house and scales, ramp from street to building, and the removal of the old incinerator plant.

Thirteen bids were received, the low bid being $94,000

and the high bid $199,600. Some of the bidders submitted several alternate propositions. All bids were carefully checked by the Commissioner of Public Works and the Engineer and were considered by the Public Works Committee of the Village Board, the Engineer's Advisory Committee and the Incinerator Plans Committee. After full consideration the proposal of the Nye Odorless Incinerator Corporation of Macon, Ga., in the amount of $172,500, was selected as providing the most suitable and desirable plant for the village of Oak Park.

Details of New Plant

The proposal of this company called for a two-story building 41 feet by 92 feet, of reinforced concrete and brick, with face brick exterior, housing three Nye circular steel encased furnaces complete, and one radial brick chimney, 150 feet high, the volume of each furnace to be not less than 818 cubic feet, and the grate area 112 square feet. The openings in the charging floor have a clear opening of 38 inches and there are five door openings for each furnace. Consideration was given to the construction of an ash tunnel in connection with the plant, but it was decided that this was not necessary or desirable. Ashes are removed from the furnace by hand into the ash car, from there to the skip hoist, and then into the storage bin. The plant is equipped with a Babcock & Wilcox pre-heater for each furnace, the heater having approximately 1,780 square feet of heating surface and of such capacity as to pre-heat the air for combustion from a temperature of 70 degrees Fahrenheit to 225 degrees Fahrenheit. Howe scales were installed at the weigh house at the beginning of the ramp approach to the building.

The work on the construction of the plant was started April 9, 1930, and garbage was first burned in it on July 12, 1930. At that time the old plant had not been removed nor was the new plant completed, but temporary arrangements were made for the new plant to be put into service while the old plant was being removed. The old plant was in use up to the time the first unit of the new plant was ready for use. After the plant was completed, tests, called for in the specifications, were made under the supervision of the Village Engineer. All requirements were found to be complied with and the plant was finally accepted on November 5, 1930.

Operation of Incinerator

Since the plant has been in operation, it has functioned very satisfactorily in every respect. All garbage, rubbish, and combustible waste, which includes leaves, brush, lawn clippings, gutter sweepings, etc., are being disposed of at the plant. Practically no commercial fuel has been used. It has been found that the percentage of garbage in material brought to the plant for disposal is at times approximately 100 per cent and sometimes very wet. In such cases a small amount of coal has been used to start the furnaces; but for some time there has been no fuel used other than the combustible material collected with the refuse. There have been no odors or smoke in connection with the operation of the plant.

Detailed information as to the operating cost is not yet available, but so far the records show that the cost of disposal at the plant has been 60 cents per ton. Two furnaces dispose of all of the material brought to the plant, and there has been an average of 50 tons per day of garbage and waste, or 60 to 100 loads per day. There is practically no ash or unburned material after burning, the residue being tin cans and other incombustible material. The plant is being operated by one man in the stoking room, two men on the charging floor and two men at night for cleaning out the furnaces and cleaning up the building. During the winter months when collections are not so heavy, it is planned to have one man on the charging floor and one man at night for cleaning out the furnaces.

Since the construction of the new plant, the dumping charges and cost of hauling to the dump have been cut approximately $2,500 in comparison with a similar period of time in the previous year.

Collection Methods and Equipment

At the present time the garbage collection force consists of the following: 17 men, 3 Ford dump-trucks, 4 one-horse carts, 1 two-horse dump-wagon and 2 trailers. The rubbish and ash collection force consists of 26 men, 14 trailers, 2 5-ton Mack tractors, 2 5-ton Sterling trucks and 7 teams.

Ashes and all other incombustible waste are being hauled to a dump about eight miles outside the village limits.

All garbage brought to the plant is drained and wrapped in paper. The village collects all garbage, rubbish, ashes and miscellaneous waste from all residential buildings in the village up to six-apartment buildings. Apartment buildings, stores and hotels are required to dispose of their own ashes. Miscellaneous waste is collected from them by the village.

Garbage from commercial buildings, restaurants, stores, hotels, etc., is collected by private scavengers or is brought to the incinerator with their own equipment. In 1930 the amount of garbage disposed of was:

13,760 tons	collected by village teams and trucks (including 1,015 cats, dogs, etc.)
3,982 tons	brought to crematory by grocers, marketmen, etc.
17,742 tons	

The amount of other waste material, ashes, rubbish, etc., was 65,808 cubic yards, all of which was hauled to the dump.

Study is being made of the waste-collection equipment, consideration being given to the combination of equipment and a more suitable type which may be used in collecting garbage and combustible waste, ashes, street sweepings and leaves. It is necessary that the type of equipment be flexible enough to be used for making short hauls to the incinerator during the summer months, and the long hauls to the dump during the winter months. At the present time the collection equipment consists of a combination of trucks and trailers.

It is interesting to note that when the bond issue for the new incinerator was approved by the citizens the question most frequently asked was where the new plant would be erected and the answer given—at the same place where the old one is located, which has been in use for twenty years. Very few citizens, even those within a block of the plant, knew it was at that location. The new plant is within a half-block of the Municipal Building, across the alley from a parochial school, within a block of the Oak Park High School, and surrounded by a residential district, in the center of the village.

The Renaissance of the Ossinings

Village and Town Unite in Comprehensive Planning and Zoning

By **CAMPBELL SCOTT**
President, Technical Advisory Corporation, New York City

THE recent adoption of official maps and the acceptance of master plans marked the passing of another milestone in the renaissance of the town and village of Ossining, New York. The real awakening began some 30 years ago when a little village on the Hudson, 30 miles from New York City, shook off its previous name, Sing Sing, and took the name of the town in which it was located. The residents of the village did not like the idea of being confused with the inmates of Sing Sing prison, or the attendant jokes, even though the prison was more famous than the village in which it was located. They preferred to have their village known for its attractiveness as a place of residence rather than of incarceration.

The town of Ossining has an area of some 12 square miles and a present population of about 18,000. Within the town there are the incorporated villages of Ossining and Briarcliff Manor.

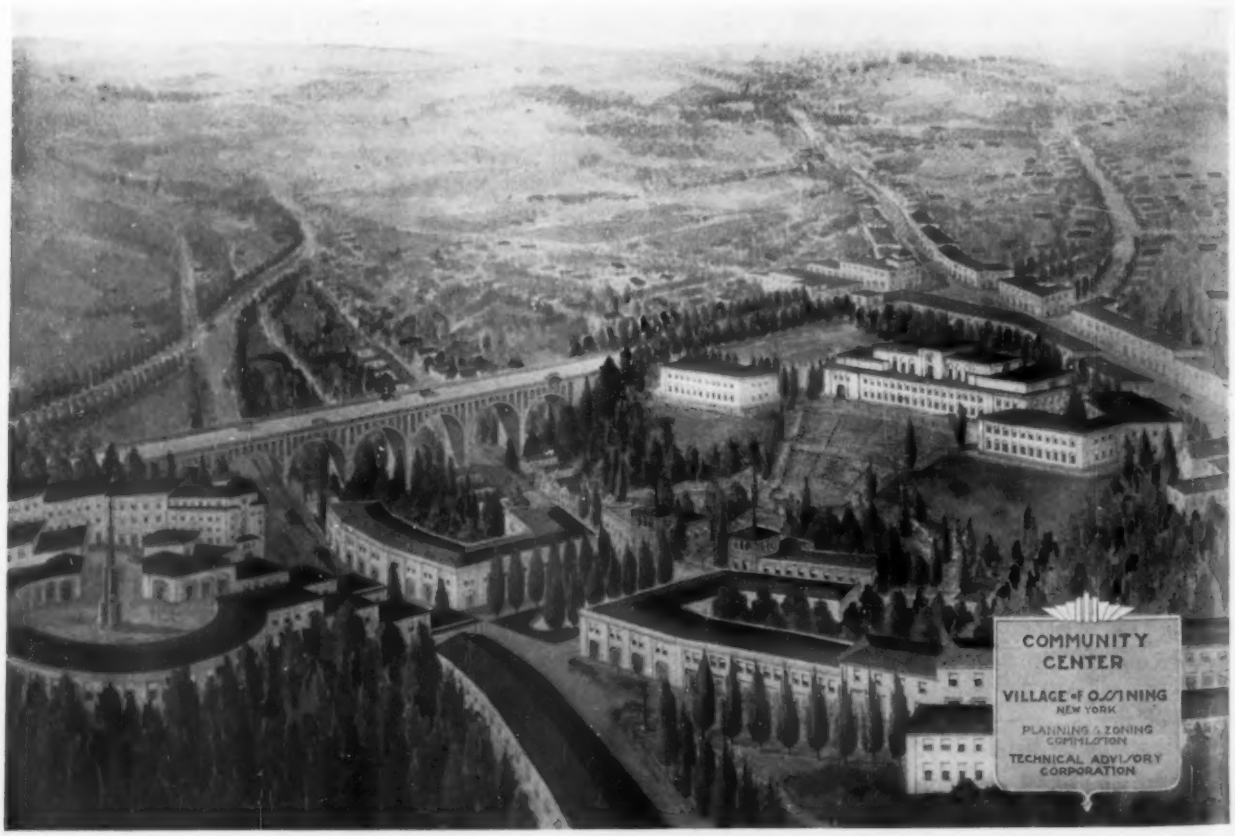
Since 1900 the population of the town as a whole has increased very rapidly, mostly within the last decade, and the concentration has been mainly within Ossining village. Outside that village the development is mainly in large estates, golf courses, country clubs, reservations, reservoirs and institutional properties.

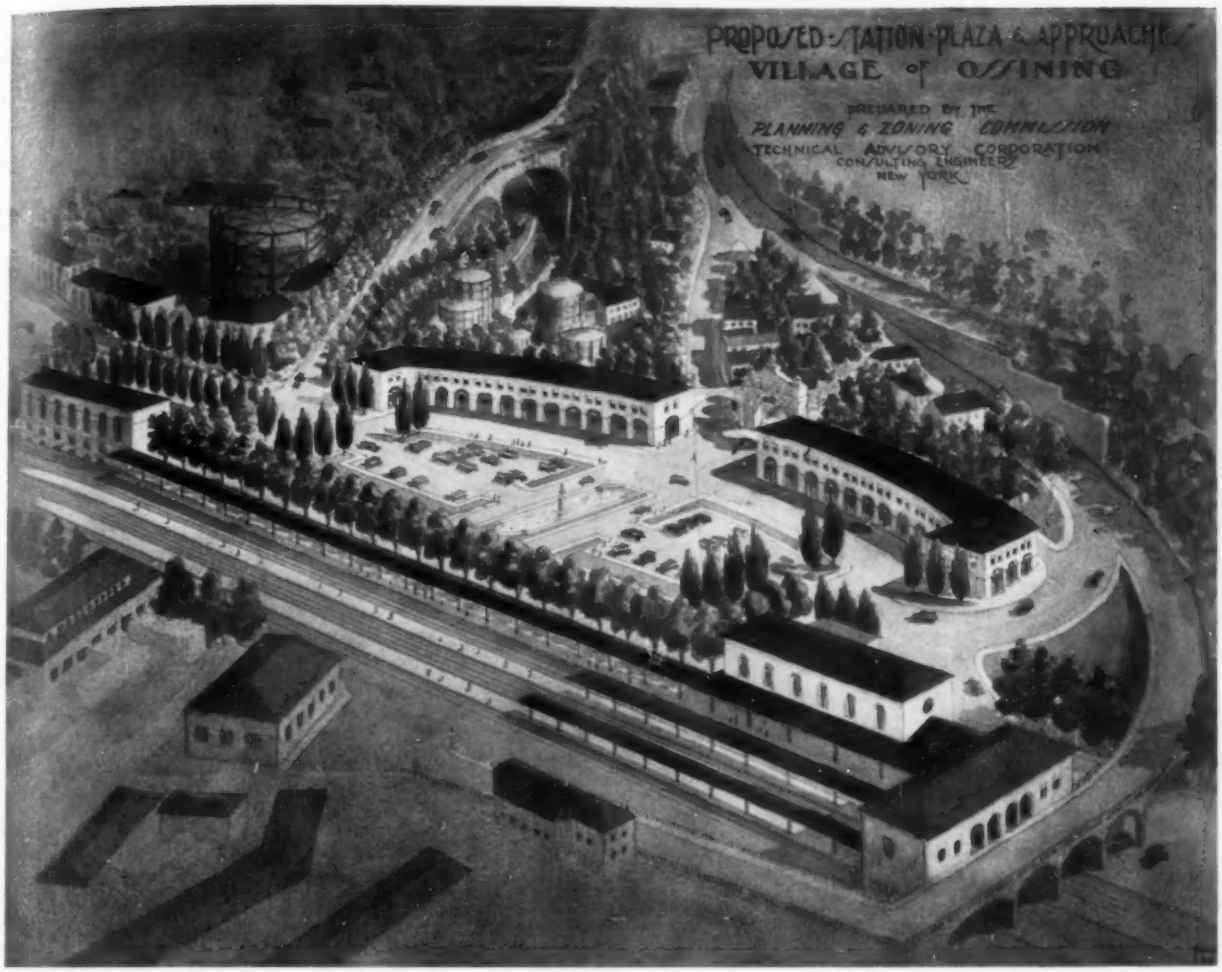
Nature has been particularly generous to the Ossinings in providing an exceptionally beautiful setting for their development. There are water, fine old trees, hills, valleys and magnificent views in great abundance.

Topography

Throughout the entire town the topography is very irregular, there being many differences in elevation as great as 500 feet. The steep hills and deep gullies have seriously hampered the orderly layout and development of lots and streets in Ossining village.

In the earlier days the highways and streets largely followed paths of least resistance—routes over which the grades would be easier and construction costs lower than had more direct lines been followed. As a result, especially in the older parts of Ossining village, there are many streets too narrow and too crooked for present-day purposes; also many dead-end and disconnected streets. In some sections large parcels of land lie practically unimproved because of the lack of streets or other means of direct access—more especially of thoroughfares. In other sections there are a few small neighborhoods, which, from

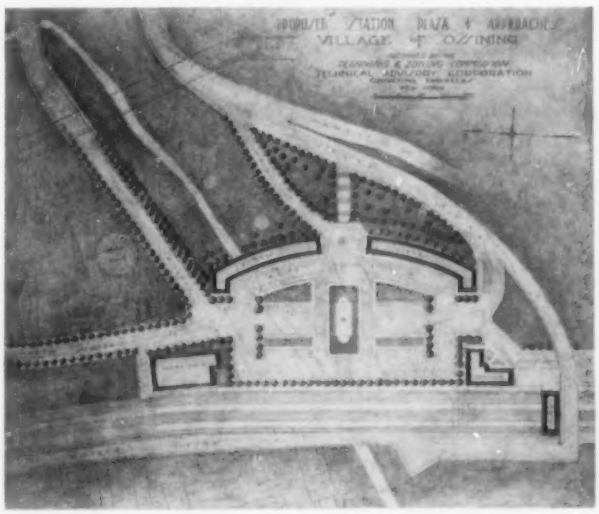




one cause or another, have become more or less blighted, but which require only concentrated effort, working to a plan, to redeem.

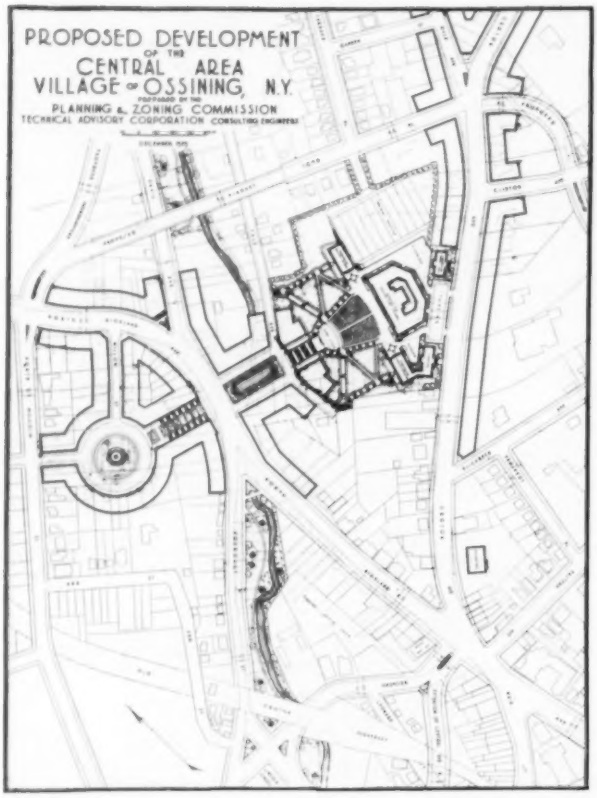
Planning Boards and Zoning Commissions Appointed

Briarcliff Manor, a young and progressive village, was the first to take advantage of the state planning and zoning acts as a means of directing and controlling its future development. Early in 1928 a combined Planning Board and Zoning Commission was established, and within the year there were adopted a comprehensive zoning ordinance, platting rules, an official map and a comprehensive village plan, together with a budgeted program of improvements which it is expected will be completed within 25 years. Inspired by the action of Briarcliff Manor and other neighboring towns and villages in planning for their future development, in the spring of 1929 the governing bodies of both Ossining town and Ossining village decided that the village of Ossining and the unincorporated parts of the town should have the same protection and guidance in their future development as had been accorded to Briarcliff Manor.



The Town Board and the Village Trustees each established a planning board and a zoning commission and, jointly acting and upon the advice of technical counsel, five men were appointed members of each of the four bodies. Thus five could function as one unit instead of four.

It was of course necessary that the planning be done not only on a thoroughly comprehensive scale and in entire harmony with Briarcliff Manor's plans, but that provision be made whereby separate action might be taken by the Village Trustees and by the Town Board on their respective parts of the combined plan.



The joint planning board and zoning commission, therefore, with the advice and assistance of their planning consultants, undertook the preparation of two sets each of comprehensive zoning ordinances, platting regulations, official maps and comprehensive master plans.

Because of the widely different characters of development in the village and in the rural parts of the town and of a desire to protect those parts against unwarranted exploitation for business and industry, two quite dissimilar zoning ordinances were prepared. That for the town provided for only single-family dwelling and limited business districts. That for the village provided for four residence classes, two business classes, and one industrial class of districts. Both ordinances have now been in effect for some months.

Early in the work, platting regulations and tentative official maps were adopted by the joint planning board and the town and village boards.

A Miniature Regional Plan

In the fall of 1930 the planning work was completed and a combined report on the entire undertaking was submitted to the town and village governing bodies.

While the report embodied separate master plans, ordinances, programs and budgets for the two municipalities, they were so coordinated and harmonized with one another and with the Briarcliff Manor plans as substantially to form a miniature regional plan.

The programs and budgets accompanying the respective master plans provide for their completion in about 25 years, and without any material increase in tax rates. The master plans have been accepted by the respective governing bodies for their guidance in the future; and revised official maps have been adopted which show a comprehensive thoroughfare and park system covering the entire town.

As the planning work progressed, the people of the Ossinings, through frequent publication in the local newspapers, were kept informed as to progress and the details of the various parts of the plans.

As a result, the public-spirited citizens are now thoroughly "planning minded" and disposed to back up strongly their planning boards in seeing that their plans are carried into execution.

Pressing Needs Disclosed

Studies of local conditions disclosed that among the more important and pressing needs were the following:

The rectification of the defects in the existing street systems, especially including the widening, straightening and extension of streets used as thoroughfares.

The provision of additional thoroughfares and the creation of a well-rounded-out thoroughfare system, including means of relieving the village's central business district of its over-burden of Albany Post Road traffic.

The provision of a system of parks, parkways, playfields and plazas.

The rejuvenation of certain blighted areas.

The creation of a community center in the village.

The improvement of the environs of the New York Central railway station; better means of approach thereto and a larger parking area.

Although the work was handicapped by unfavorable topographical conditions in many cases, happy solutions of all the problems were found and embraced in the master plans.

New Thoroughfares and Parkways

On the official map of the village two new thoroughfares have been provided, one to the east and the other to the west of the Albany Post Road. These, with the proposed widening of the Post Road itself, will greatly relieve this important highway of its present great overload.

These two relief thoroughfares, beginning at the south end of the village, will serve to carry through traffic entirely around the village's thickly built-up and business districts. Several other new thoroughfares, running through both the village and the town, will further aid the distribution of traffic so as to relieve presently congested streets.

In addition to various playfields, parks and other open spaces, the master plans provide for several parkways, the principal one of which provides a direct connection between the center of the village and the county park system.

In laying out certain of the thoroughfares and parkways it was found possible to select routes largely along streams and through gulleys and poorly developed areas where land values are relatively low. The construction of these new arteries will assure the rejuvenation of many neglected areas and the material increase in their values.

Community Center Planned

Almost in the heart of the village along the Albany Post Road, with the Village Hall, two of the high schools and the Public Library little more than a stone's throw away, lies a large, poorly built-up area which is greatly in need of modernization and better utilization. In the center of this area is a deep hollow through which a brook

ums and which, with its steeply sloping sides, forms almost a natural amphitheater. Here is to be created a much-needed community center, as shown in the illustration on page 88, and the map on the facing page.

The master plan contemplates the razing within this area of a considerable number of antiquated buildings and their replacement by attractive modern buildings. In the lower part, or the basin, of this area, through which the Albany Post Road passes, large plazas are to be arranged as the nuclei around which is to be built up a model business district with ample provision for off-street car parking. On one side of the Post Road, on the higher ground and slopes, the plan provides for large groups of apartments—some on terraces.

On the opposite side of the Post Road, on the slopes and higher elevations, the plan provides for attractive landscaping and terracing, and sites for a new town hall, a new junior high school, the relocation of an existing school, an addition to the Public Library, a bandstand, an amphitheater, a playfield and large parking places.

Through following out this important part of the master plan of the village, it will be possible to effect a complete transformation of a shabby neighborhood into a veritable beauty-spot with great profit to the entire village of Ossining.

Railroad Station Plaza

The entrance to the village from the New York Central Railroad Station is now anything but convenient and attractive. Approach to the village is practically limited to one street, over steep grades, across a neglected open space with limited parking facilities, and through a neighborhood of cluttered, antiquated buildings.

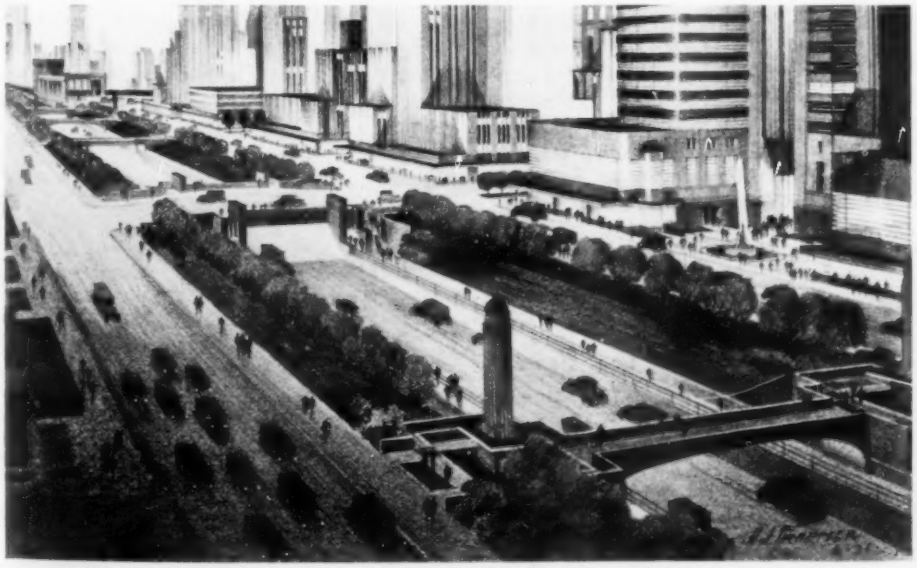
To improve this condition, the master plan contemplates the razing of several groups of old buildings, the readjustment of several streets in the immediate vicinity of the station, and the creation of a large and attractive station plaza, with two ample approaches over thoroughfares, and flanked on one side by two groups of new business buildings.

A Four-Way Sunken Speedway Proposal Is Submitted for New York's Chrystie-Forsyth Area

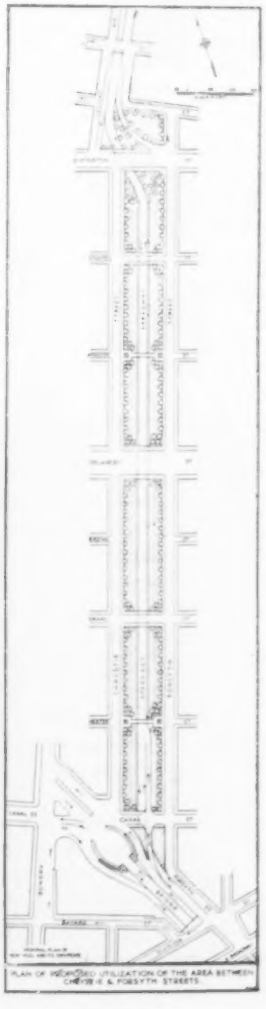
SEVEN blocks of land lying between Chrystie and Forsyth Streets in New York City's lower East Side, are owned by the city itself, having been acquired by condemnation in 1929, and cleared. The intentions of the present administration to use this area for low-cost housing developments have not materialized. Meantime the Regional Plan of New York and Its Environs has completed and placed before Mayor James J. Walker proposals for use of the area as a depressed roadway for passenger vehicles developed in conjunction with park and landscaped spaces.

This roadway would form a link in a proposed express highway down Second Avenue. The four-lane way would be built down the middle of the blocks between the two streets, the remainder being used for parks and planted, sloping banks. Chrystie and Forsyth Streets would be maintained at their present level as local traffic streets. Intermediate cross streets would be carried over the sunken way by bridges.

George McAneny, President of the Regional Plan Association, declared in submitting the plan to the Mayor that "considering the needs of the city as a whole, there is none more important than the provision of an unobstructed highway approach to the Civic Center and the downtown district." He added that keeping the area open, for this purpose, would in the end profit the city more than permitting it to be built upon.



A SECTION OF THE PROPOSED 300-FOOT AVENUE



Repairing Pavement Settlements

By **W. H. ROOT**
Maintenance Engineer,
Iowa State Highway Commission

THE ORIGINAL GROUTING MACHINE, A TRACTOR VALVE AND VALVE GUIDE

EVERY state having a considerable mileage of pavement encounters to a greater or less degree the problem of repairing pavement settlements. Why do pavements settle, anyway? Sometimes it almost seems as though the placing of a slab of concrete on an old fill in some mysterious way causes the fill to settle. This, of course, is not the case. A settlement of a few inches in an unimproved fill or in a gravel-surfaced fill is quickly and easily repaired by the maintenance forces, and the public does not become aware of the settlement. A pavement settlement, however, is immediately obvious to every motorist and cannot be so easily repaired.

Many of our heavy fills built a few years ago were constructed without rolling because we did not anticipate paving over them for from five to ten years. Then county bonds were voted and it became necessary to pave over them immediately. As a result, we have had many settlements on these projects. There have been more settlements on the 2,300 miles of pavement constructed prior to 1930 than we expect to get on pavements constructed after that time, because all fills are now being rolled as constructed. In our opinion, in spite of every precaution that may be taken, fill settlements will still occur, and no state should be so cocksure of its construction efficiency as to assume that it is immune from pavement settlements.

A careful survey of Iowa's 2,317 miles of pavement in the spring of 1930 revealed the fact that there were 326 settlements, 170 of which were classed as safe at a speed of 40 miles, and 156 of which were reported as dangerous at 40 miles per hour. This is only one dip per 7 miles of pavement, but in all it represented nearly 3 miles of settlement that needed attention.

Methods of Repair

Prior to 1930 three general methods of repair were commonly practiced in the various states. The most common method and, in our opinion, the least effective, has been the so-called blacktop repair. In this method the pavement surface is usually cleaned and a prime coat of bitumen applied. The depression is then built up with pre-mixed or mixed-in-place bituminous concrete, using the largest size aggregate practical. The base course is usually covered and feathered out with a course of fine aggregate bituminous concrete, and the resulting surface sealed with a light application of bitumen and sand. This class of repair possesses the following advantages: (1) it can be quickly done; (2) it is comparatively cheap; (3) no special equipment and no skilled labor are required; (4) traffic is not greatly inconvenienced; (5) if properly done, it presents a very satisfactory riding surface.

This type of repair has one inherent defect which, in our opinion, should eliminate it from consideration for all dip repairs except those of an emergency nature. This is the fact that blacktop patches do not cure pavement settlements; they simply cover up the trouble and in most cases are therefore only a temporary relief. This type of repair is comparable to the treatment of an infected tooth with novocaine.

Repair by Jacking and Backfilling

A second method of repair has been the jacking and backfilling process. In this method an attempt has been made to cure the settlement by eliminating the cause. As generally practiced, the plan consists of the following operations. A longitudinal trench is dug under each edge of the pavement for practically the full length of the dip. Jacks, usually hydraulics, are placed at intervals along the trench. They must be well supported with timbers. Timbers are also placed between the jacks and the pave-

THE HYDRAULIC SLAB-RAISING MACHINE AT WORK
Note that traffic is maintained during the operation

ment. The jacks provide the force for raising the edges of the pavement. If the pavement is cracked longitudinally, or if it has a center joint, it is necessary to provide some means of raising the center of the pavement. This is usually done by means of a plank or steel bridge extending from one edge of the pavement to the other. A hook from the center of the bridge is placed through a hole in the pavement at the center line, and force is thereby applied to raise the center of the slab at the same time that the edges are raised.

When the slab has been raised to grade, or a little above grade to allow for settlement, the open space under the slab is filled with earth or sand. In doing a considerable amount of this work in Iowa we found that sand blown under the pavement with a Cement Gun gave best results.

This type of repair has at least one advantage. The voids under the slab are filled. This decreases the liability of further settlement. On the other hand, this kind of repair has some disadvantages: (1) it is expensive; in raising about 5,000 square yards of pavement in Iowa in 1929 we established an average cost of $1.75 per square yard raised; (2) traffic must be detoured while repairs are in progress; and (3) in case of further settlement additional raising is just as difficult and expensive as the original.

Repair by Replacing Slab

The third plan for repair of pavement settlements which has been in more or less common use is that of breaking out the old slab, rebuilding and rolling the subgrade and then placing a new slab thereon. At first thought this type of repair would seem to be the most permanent of all; however, it is only as permanent as the fill upon which it is placed. Also, it is very expensive, costing not less than $4 per square yard on the average. Therefore, this type of repair is not feasible except in cases where it is quite evident that no further settlement will take place.

Raising Slabs by Hydraulic Pressure

So much for the history of settlement repair. This brings us to the 1930 development of the work.

The engineering profession has long been familiar with the laws of hydraulic pressure and their various applications to engineering problems; it remained, however, for John Poulter, a mechanic of the Iowa State Highway Commission, to apply this hydraulic principle to the raising of pavement slabs. For a considerable period of time he experimented with simple homemade devices for producing hydraulic pressure and applying it to slabs. When he had convinced himself that slabs could actually be raised by hydraulic pressure, he developed a machine to produce the pressure and applied for a patent on the process of raising slabs by this means.

The first machine used for raising a slab by this method consisted of a tractor valve and valve guide. The guide was grouted in a hole which had been drilled through the slab, mud was poured into the guide and the valve stem inserted. Pressure was produced by the weight of a man standing on the valve.

From this small beginning has been developed the modern Poulter mud pump for raising pavement slabs. The pump is a two-cylinder reciprocating pump powered by a 20-horsepower gasoline motor. It is made up of the following principal parts: (a) a hopper for receiving earth, water and cement; (b) a mixing chamber for mixing the materials; (c) a receiving chamber for holding the mud and delivering it to the cylinders; (d) the pump itself; (e) an outlet hose; and (f) the power plant.

THE PRESENT TWO-CYLINDER RECIPROCATING PUMP POWERED BY A 20-HORSEPOWER GASOLINE MOTOR

The actual raising of the slab is a simple process. First, a 4-inch expansion is cut across the pavement at one end of the settlement. This is done to prevent a binding action when the slab is raised. Next, 2½-inch holes are drilled through the slab, some near the edge and some near the center joint. The holes are spaced from 4 to 10 feet apart, depending upon the location of the cracks in the slab. This work is done with the ordinary compressed air jack hammer and pavement breaker.

After the slab has been prepared as outlined above, the mud pump is put into operation. Earth is brought to the pump in trucks; black top soil and loess have proved most satisfactory. Sand wears the cylinders too fast, gravelly soil clogs the valves, and heavy clays do not readily form the creamy grout necessary.

Portland cement is added to the earth in the proportion of 1 to 20. The primary object of adding cement is to cause the grout to set-up quickly after it is pumped. This "setting-up" is not a typical cement set, but is an action which produces the same effect as a slight drying-out of the mixture. It was early found that under certain conditions the mud pumped into one hole would escape from other holes or from under the edge of the slab and no pressure could be built up, but it was found that by waiting for an hour or two the mud would stiffen sufficiently so that pumping could be resumed. The addition of 1 part cement to 20 parts earth has reduced this waiting time from one or two hours to from fifteen to twenty minutes. Laboratory experiments were carried on, using various proportions of lime, cement and plaster of paris, and the 1 to 20 proportion, using portland cement, was established as the most satisfactory mix. These experiments also showed that the addition of cement greatly reduced the shrinkage. The shrinkage of plain earth and water mixture was found to be 10 per cent, while the shrinkage of the 1 to 20 mixture was found to be only 3½ per cent.

The hose leading from the pump is a high-pressure 2½-inch fire hose. This is reduced at the outlet to a 2-inch steam hose, which has some elasticity. This outlet hose

is placed in the hole in the pavement, and when the pump is started the pressure of the mud passing from the 2½-inch hose to the 2-inch outlet expands it and holds it tightly in the hole.

The earth and cement are shoveled from the truck directly into the receiving hopper, and water is added. The materials pass from the receiving hopper to the mixing chamber, which resembles the old-style continuous concrete mixer. When the material enters the pump, it is a soft grout, the moisture content of which is about 45 per cent.

No figures are available as to the exact amount of pressure built up by the pump. The weight of the slab, of course, is only about ¾-pound per square inch, but fairly high pressures are necessary in order to break the slab loose. Once it starts, little pressure is needed to raise it. Some difficulty has been experienced in starting the slabs, but none have been encountered that could not be raised. Some of the older outlet hose have blown out. It is estimated that in some cases a pressure of 50 pounds per square inch has been built up.

Results Obtained

Iowa has had five mud pumps operating the past season. Some of the slabs which were raised early in the year settled slightly again, and the mud pump was brought back and the slabs again raised to grade. The holes in the slab will not be filled permanently until no further settlement is probable.

The average pavement dip during 1930 required 9½ cubic yards of material for the filling of the voids and the raising of the slab. Inasmuch as the pumps have a capacity of about 1 cubic yard per hour, it takes just about one working day to raise the average settlement. The air-compressor crew, consisting of two men full time and a third man half time, is able to keep ahead of the pumping crew without difficulty.

The fact that a considerable quantity of water is introduced into the subgrade is not considered to be a serious matter. While the mud as pumped has a moisture content of about 45 per cent and while the mud which has been under the pavement for two weeks in the fall of the year still contains about 43 per cent moisture, it is not believed that serious harm will result therefrom. The earth as delivered to the pump has a moisture content about the same as the average subgrade on fills, or approximately 25 per cent.

The figures on the Iowa work are interesting. During the season 200 settlements, comprising 9,292 linear feet, have been raised from 3 inches to a maximum of 13 inches. For this work 1,911 cubic yards of earth and 2,299 sacks of cement have been used; 899 cubic yards of blacktop would have been required to raise the settlements by that method.

Costs

The materials have cost $1,580.16, the labor $8,329.08, and the rentals of equipment $8,987.29, making a total cost of $18,896.53. As 18,584 square yards have been raised, the cost has been $1.02 per square yard. Also, as 1,911 cubic yards of earth have been pumped, the cost has been $9.88 per cubic yard of material pumped. Of the 1,911 cubic yards of material used, 899 cubic yards were required to raise the slab to grade. The remaining 1,012 cubic yards, 53 per cent of the total, went to fill the voids under the pavement.

The principal advantages of this mud pump method of raising pavement settlements are: (1) the work can be quickly done; (2) it is not an expensive process; (3) skilled labor is not required; (4) traffic does not have to be detoured; (5) it comes nearer to curing the cause than any other method devised; (6) it lends itself readily to additional raising if additional settlement takes place.

While this method is slightly more expensive than the blacktop method, which costs about 75 cents per square yard, it is so much more permanent that it is believed the extra cost is justified.

It is anticipated that this method can be extended to prevent settlements. Pavements on fills which are expected to settle can be sounded occasionally, and if the soundings show voids under the pavement, these voids can be pumped full of mud before the pavement settles. Such procedure would result in greater safety to the traveling public and in greater economy to the state.

Acknowledgment.—From a paper presented at the Seventeenth Annual Conference on Highway Engineering at the University of Michigan.

Criteria for Maintaining Balance of Program in County Health Departments

THERE are four factors which may serve as criteria for maintaining balance of program in county health departments. These are, according to F. L. Roberts, M.D., County Health Officer, Gibson, Tenn., (1) definition of problems, (2) fitting of resources to problems, (3) use of the Appraisal Form, and (4) planned-work programs. To quote from Dr. Roberts' paper published in *Public Health Reports*, May 8, 1931:

"In defining problems confronting the health department, the communicable-disease problems holds first place. The primary function of a health department, the primary reason for its establishment and inclusion in the body politic, was and is the control of communicable disease. It is true that the scope of health work has widened, and rightly so; but this does not alter the fact that communicable-disease control is of paramount importance."

"The second criterion is the fitting of resources to problems. It is useless to hunt elephants with a sling shot. . . . . The larger part of one's time and efforts should be spent on major problems, and other activities should be subordinated. Such a plan is not always completely workable. Public opinion may demand certain activities that the health officer must perform in order to retain the public support."

"The third criterion is the use of the Appraisal Form of the American Public Health Association."

"The fourth criterion is the use of the planned-work program. Any health officer will find that his performance will increase in amount and efficiency when he follows a charted course. In Gibson County an attempt is made to chart a course each month. A proper schedule allows plenty of latitude for other work that might come up unexpectedly. What the schedule aims at is to accomplish certain definite things at definite times during the month. Such a plan will do away with a great deal of haphazard work."

Patrolling Cities from the Air: A Forecast

By A. E. DAVISON, B.A. Sc., C.E.
Toronto, Ont.

RECENTLY the pilot of an air-mail plane passing over the town of Gull Lake, on the Canadian prairies, during the night, noticed a burning building. He came down sufficiently to rouse the inhabitants, who were able to confine the loss to one building. Not long ago a railway wreck was averted by an aviator who left his course to attract the attention of the train crews. Still more recently the police of Toronto District (according to the press) chartered an airplane to examine from the air a rendezvous where a fugitive from justice was supposed to be hiding, and to explore which, from the ground, was impracticable—this apparently being the first use of aircraft by that organization for assistance in discovering criminals.

The imagination of a Jules Verne is scarcely needed to visualize the effective use of aircraft in protecting citizens and their property; and this applies with particular force to aircraft that are capable both of speedy horizontal travel and of nearly vertical ascent and descent, with the ability to maintain a relatively stable position in the air. The autogiro seems to be capable of both these duties. Inventors have struggled for a long time with the more general helicopter principle with little success other than that exemplified by the autogiro. The cost of maintaining machines of this type, along with the necessary pilots and observers above a city during the night, would be small as compared with the carrying charges and operation of police and of police signal systems, which must be changed every few years on account of new types of equipment and new methods. During these latter days of racketeering, the enforcement of the law needs every effective reinforcement and assistance that can be found.

Patrolling by Autogiro

An autogiro that has been fully equipped with modern loud-speakers, exhaust silencers, wireless-telephone, searchlights, directional-sound-recorders and a few more gadgets, could, without the use of firearms at all, very effectively reinforce the patrolling of a city. With relief machines available, many other important services, in addition to police patrol, could be rendered, such as the saving of lives, including policemen's lives, conserving the time of the citizens and, if desired, speeding up living even during these hurry-up days.

If three autogiros, manned by six experts, trained in observing and capable of recognizing the possibilities of their service, were set aside permanently to patrol a large city from dusk to dawn, the expense might easily be justified by resulting experiences. Without waiting years, a "log" or record of a machine so engaged might even during the first few months yield a story such as this:

Autogiro B-13 is patrolling southward at 6,000 feet above the eastern part of the city on the morning of August 5, 1931. A reconnaissance has just been completed making certain that

ABOUT TO TAKE OFF

The Autogiro Comes to the Fore

Experimenting with helicopters, or flying-machines designed to ascend and descend more or less vertically, has gone on for many years. The type pictured here, invented by the Spanish engineer, Juan de la Cierva, has gone through some eight years of development, signalized by a landing on the White House lawn in Washington on the occasion of the presentation of the 1931 Collier Trophy of the National Aeronautic Association to Harold F. Pitcairn and his associates in the development of the autogiro.

Whether the autogiro should be considered as one kind of helicopter or as a thoroughly distinct type is a matter of some uncertainty; its sponsors hold to the latter view, and state that the helicopter as such has not as yet achieved successful flight, although hundreds of experimenters all over the world are working with the principle. The autogiro is distinguished from helicopters generally in that the horizontal vanes are not rotated by the motor except just prior to taking off, but are kept turning by the pressure of the air against them; they are also not rigidly connected to the axis but are hinged to permit vertical and horizontal play. The ordinary type of airplane propeller and motor provides the actual propulsion. There is also a small fixed wing which at high forward speeds provides some support, but not otherwise; it is, however, important for lateral balance and control, being provided with ailerons.

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AUTOGIRO RISING FROM WHITE HOUSE LAWN

smoke was coming from a stalled steam locomotive instead of from a fire in a lumber yard as at first suspected.

At 2:47 a.m. the sound detectors record faintly four shots in rapid succession. The sound records were quite different from the monotonous noises of auto exhausts, horns and street cars. The directional finders indicated clearly that the noise was far away to the west.

The Automobile Fugitive

The observer reports this unusual occurrence by wireless 'phone to police headquarters. Heading downwards, the pilot swings west and presently is traveling at the rate of 125 miles per hour. At 2:51 a.m. police headquarters telephones the observer in the autogiro that there has been a hold-up in the western part of the city, naming the exact location. At 2:52½ the observer and pilot are quite sure they now know what is happening and understand the sequence of events. They see a streak of light flashing along and know that a fugitive automobile is traveling southwards toward a main highway carrying traffic to the west.

Telephones are busy. A reserve autogiro is ordered into the air to appear at the rendezvous and to await orders, which are presently given, to call the policeman from his home at a suburban town along the western highway. At 2:59 a stentorian voice, louder than has ever been heard in that area before, calls from a point 700 feet directly above the officer's house instructing him to meet an automobile at a pre-arranged point on the highway. The policeman does his bit; another crime is stopped; justice takes its course.

His work was not difficult, because the fugitive car had been bathed in light, almost brighter than daylight, from the searchlight of the autogiro which had been trailing it. This was done for a quarter of a mile of travel before the police officer signaled a stop. The surprise was so great that there was no mental attitude supporting a fight. The driver did not know what would happen next and was going to stop anyway to see what it was all about. At 3:30 the reserve plane relieved B-13, and one incident in civil air patrol was closed.

Fire, Smoke and Fog

A few years hence, such experiences will be quite within the normal functioning of live municipal governments. There are, however, many other errands quite as hazardous, but more peaceful. Cooperation is necessary, and will of course be evident between the municipal corporation and all public service organizations, if service is always to be the dominant note.

Fire detection has been mentioned, and air patrols could be worked out to show great economy, as there is a wonderful opportunity to observe fires from the air just as soon as the first smoke rises in daytime or the first glow or reflection is seen at night. When the objectionable features, economic losses and health hazards of the smoke nuisance in urban centers are better understood by the public, air patrol may be the most efficient means of recording smoke conditions and of detecting offenders.

Autogiros with safe landing facilities could work more effectively and safely above fog than airplanes. As a result, a large part of the annoying noises of fog-horns, marine signals and boats approaching a harbor might be eliminated, if the autogiro were sent out to bring incoming steamers to dock each morning that the fog does not rise much above 100 feet. On some mornings, of course, the machines may be otherwise engaged, and a few fogs may extend upwards so far that the autogiro must, in the interest of safety, return early to its base. The bringing of one passenger steamer to dock on time, through a fog, might easily save many hours for hundreds of individuals and avoid for them the hazard of groping along through a fog, depending only upon sound and a navigator's good judgment.

Transmission Lines and Highways

There are several other important uses for the heli-autogiro, such as patrolling transmission lines in such a way as to observe from the air just where faults are when the lines are being tested out by impressing voltage upon them—if that is ever done, and for patrolling traffic on highways when traffic is particularly heavy, as on holidays. The psychological effect in patrolling highways is quite as important as in the case of civil air patrol over cities where the purpose of the patrol would be to prevent racketeering. If the autogiro having a loud speaker could drop down over a driver who has been "cutting in" extensively and tell him he is liable to be haled to court, the effect would be magical. The driver would then know he could be watched closely for the next half-hour. One such experience would be a much greater deterrent than having a half-dozen motorcycle patrolmen on ten miles of road, as these ground patrolmen are watched consistently through the back window of cars driven by men who may have a criminal record, as well as by fast and reckless drivers. Generally speaking, the most desirable results which the operation of autogiros could have in air patrol work would be the psychological effect. It would be a salutory deterrent even when it is not in the air, because most drivers could never know what is going on directly over an enclosed car.

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PITCAIRN-CIERVA AUTOGIRO AT REST

The Operation of a Municipal Plant Handling Only Domestic Sewage

By **A. J. FOOTE**
President, A. J. Foote Engineering Corporation, Larchmont, N. Y.

THE sewage disposal works of Sewer District No. 1 of the town of Mamaroneck, N. Y., in Westchester County about 20 miles northeast of New York City, occupies an unusual position among sewage treatment plants, as no trade wastes are delivered to the plant. This sewer district was formed in 1920, when the population was less than 3,000. Prior to that time there were no sewers or disposal plants. The first sewers were laid and the plant was built in 1921. Since then the growth of the town has been phenomenal, and there has been a constant additional footage of sewers laid each year, so that today there is a population of about 6,500 persons, of whom there are about 5,500 contributing to the sewers, with a total length of sewers of all sizes of about 37 miles.

The original installation of the plant consisted of bar screens, a screen chamber with two sedimentation tanks, a chlorine mixing chamber, and a small sludge pumping station equipped with one 450-g.p.m. pump. There were three hydrolization tanks built with dry rubble walls below ground level and with a concrete roof, and a 12-inch cast iron outfall sewer 6,000 feet long discharging into the water of Long Island Sound about 1,000 feet from the nearest land.

Since the original installation there have been numerous additions. A second set of sedimentation basins has been installed, together with a grit chamber; the pumping facilities in the sludge pump house have been increased; sludge storage tanks have been constructed, using the old hydrolization tanks as the foundation; a sludge digestion tank with a Downes floating cover has been installed for the purpose of sludge digestion; and two glass-enclosed sludge drying beds have been built.

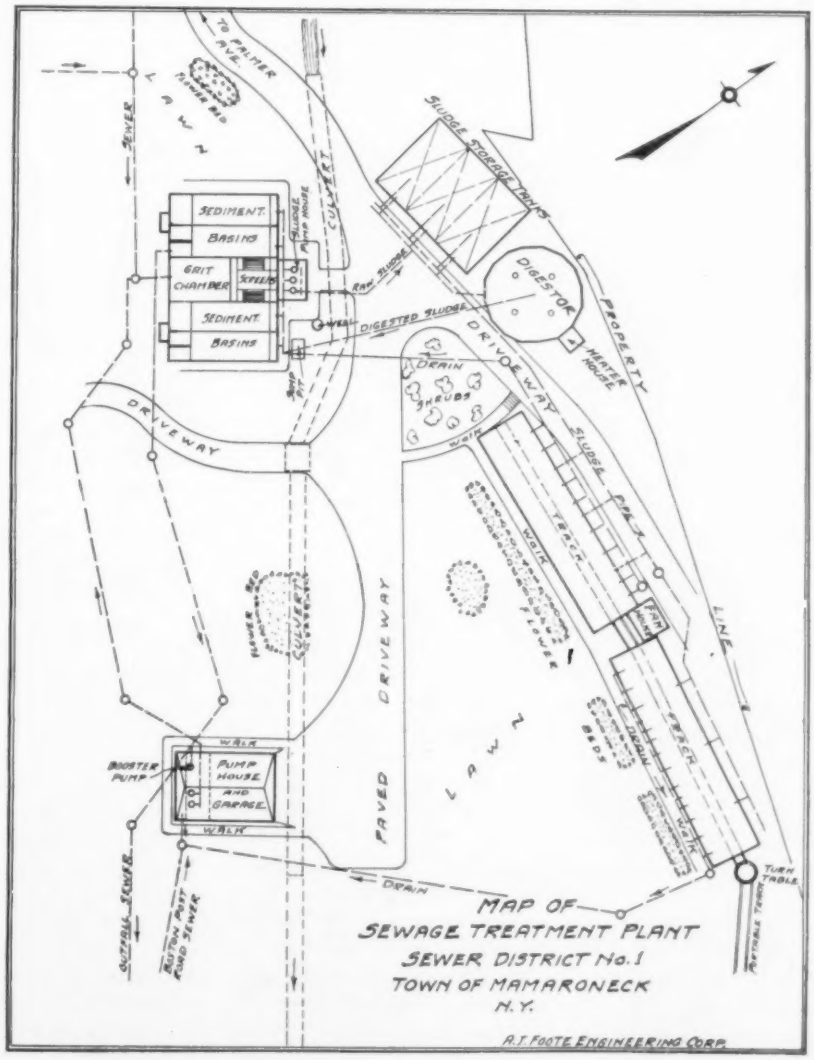
The original plant was designed with an estimated capacity of 100 gallons per capita per day. Actual records, however, over a period of four months show an average of 190 gallons per day, which can be partially accounted for by illegal connections such as house leaders and garage drains.

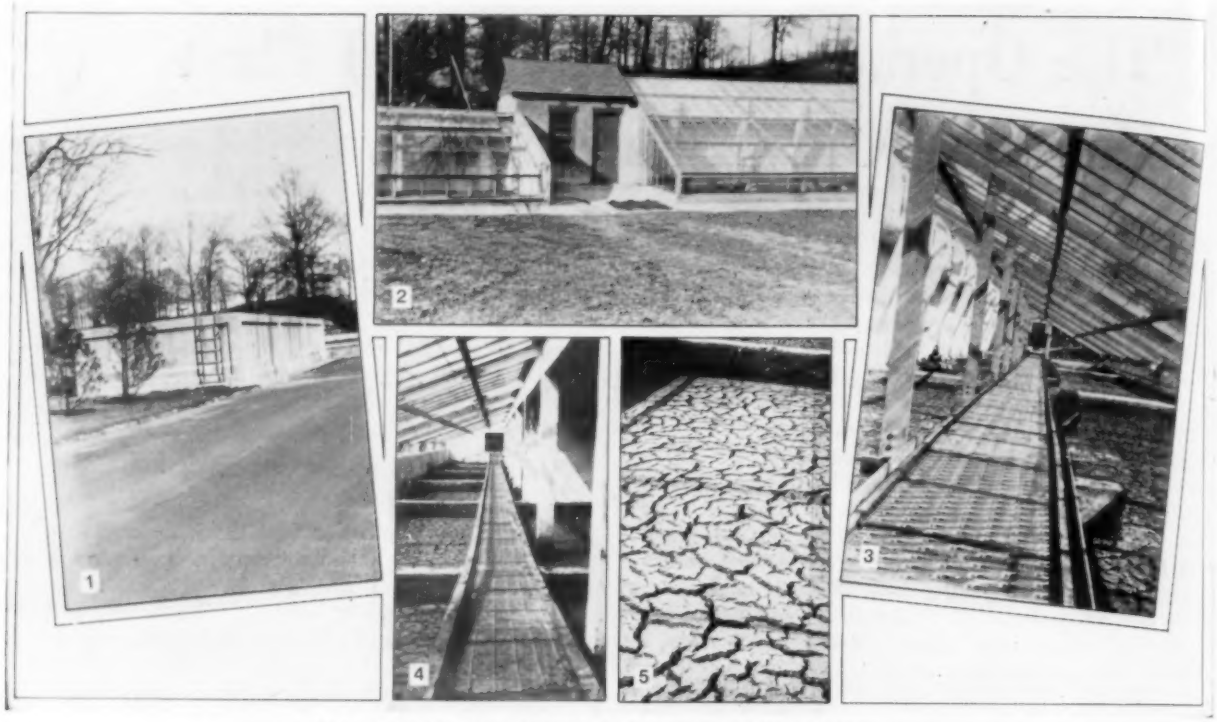
Collection System

All of the sewage is brought to the plant by gravity with the exception of that from two small areas which had to be pumped into the sedimentation basin. The sewage from the low-lying areas flows to the disposal plant site and is lifted into the sedimentation basins by two American Well Works pumps housed in a combined pump house and garage built in 1927.

Low-Lift Sewage Pumping Station

The pump house and garage, which covers an area of 25 x 40 feet is constructed of 12-inch concrete blocks stuccoed with a rough buff-colored finish. The type of architecture is Spanish, with a green tile roof and green trim, making an attractive building. The easterly end of this building, an area of 25 x 25 feet, is given over for a





SLUDGE STORAGE AND DRYING FACILITIES AT MAMARONECK, N. Y.

1. The sludge storage tanks. 2. The fan house and the old and new sludge drying beds at the left and right, respectively. 3. Interior of the new sludge bed. 4. Interior of the old sludge bed. 5. A close-up of the sludge dried and ready for removal

garage in which are housed the trucks, air-compressors and other equipment belonging to the Sewer Commission. It is equipped with wire glass windows set in steel sash and with rolling steel shutter doors. There is also a concrete drop pit with a removable plank floor for the use of the mechanics in making repairs on the equipment. Under the garage is the fire room, in which are the hot water heating boilers and the coal bins. Coal is delivered to the bins through a manhole in the garage floor, and ashes are hoisted out through a trap-door by means of a pulley block. The westerly end of the building, a space of 14 x 25 feet, is utilized as the motor room, where the starting switches, the main line switches, the controls, both manual and automatic, and one 10-horsepower and one 25-horsepower motor, are located.

Ten feet below the motor-room floor is the mezzanine floor, where a 2,000-gallon-per-minute centrifugal pump driven by the 25-horsepower motor on the floor above is located. This pump and motor are used as a booster on the outfall sewer line.

On a level 18 feet below the mezzanine floor are the wet well and the dry well, housing the two lift pumps, each of a capacity of 500 gallons per minute against a 35-foot total head and direct-connected to 10-hp. motors. A gasoline-driven pump as a standby unit is here and has a capacity of 200 gallons per minute against a 30-foot total head.

Within the garage and about 12 feet above the floor is a fairly large and comfortable room for the use of the attendant, who is on hand at all times during the day and night to take care of any breakdowns which may arise.

When the sewage has accumulated in the wet well, nearly filling it, a float operates a starting switch connected with one of the 10-horsepower motors. If the inflow is greater than this pump can handle, another float operates the starting switch of the second 10-horsepower motor. The two 500-gallon-per-minute pumps driven by these motors lift the sewage through a 6-inch force main about 200 feet long to the sedimentation basin.

District Pumping Stations

Sewers within the Dillon Park area were laid during 1929 and 1930. The sewage is collected at a small booster station on the salt marshes, whence it is pumped through a cast iron force main to a high point from which is flows by gravity to a second booster station. This second pump lifts the sewage through a 10-inch force main about 6,000 feet long to a high point about 400 feet from the Weaver Street sewage disposal plant; thence it flows by gravity to the disposal plant sedimentation basins.

The Weaver Street Disposal Plant

After sewage has been delivered to the Weaver Street disposal plant by the low-lift pumps, it travels through a grit chamber 14 feet wide, 28 feet long and of 5-foot average depth. It then flows to the screen chamber, equipped with a coarse bar screen with 1¼-inch open spaces between ½-inch bars, thence through the influent channel to the sedimentation basins, which are 46 feet long, 13 feet wide and 18 feet average depth. These basins were designed for a detention period of four hours. At present, with the large amount of infiltration, the detention period is only three hours. The effluent passes over a weir to the chlorine mixing chamber and thence through the outfall sewer to Long Island Sound. Even with the decreased detention, the effluent is stable and clear.

Sludge Pumping

The sludge accumulation in the sedimentation basin is pumped daily from one of the four sections to the sludge digestion tanks. The records show that the quantities of raw sludge accumulated in one tank every four days amount to about 300 cubic feet.

The sludge pump house is 10 x 14 feet in plan, constructed of terra cotta building tile, stuccoed on the exterior and plastered on the interior. The roof is of varicolored rough slate. The sludge pump house superstructure is built on a reinforced concrete pump pit which houses the sludge pumps.

The pump house is equipped with two vertical Fairbanks-Morse centrifugal pumps, each with a capacity of 450 gallons per minute against a 30-foot head, direct-connected to Fairbanks-Morse 10-horsepower motors, and one American Well Works vertical pump with a capacity of 450 gallons per minute against a 20-foot head, direct-connected to a 7.5-horsepower motor.

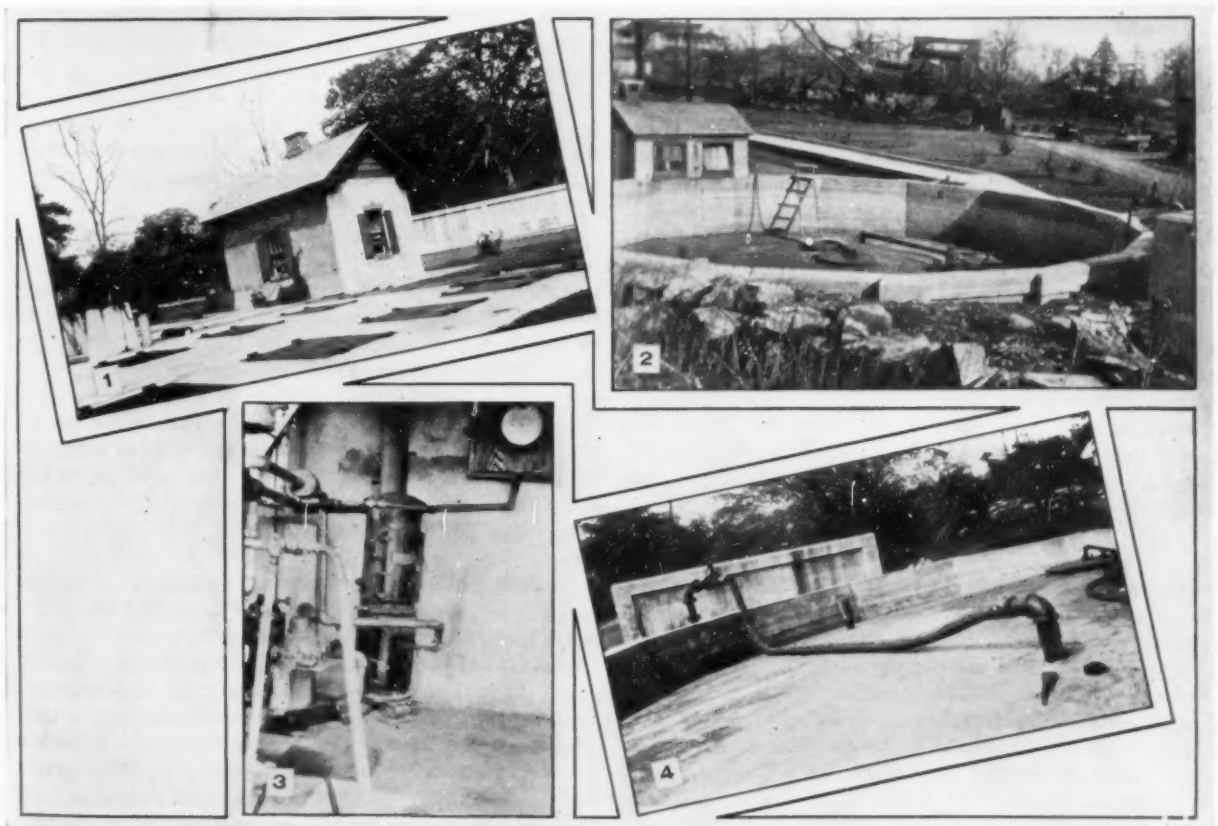
These pumps with their piping are so arranged that they can be used for several purposes, such as pumping sludge from the sedimentation basin to the digestion tank or storage tank or from the digestion tank to the storage tank. They may be used also to pump liquids from the digestion tank and sump to the sedimentation basin, or the liquid from one of the sedimentation tanks to any of the others. One of these pumps can also be used to pump water from the sump through hose connections for washing down the walls of the sedimentation tanks or for lawn sprinkling.

On the ground floor of the sludge pump house are the main-line switches, starting switches, controls, chlorinator and a weir meter which is connected with the weir chamber by a 3-inch pipe. This pump house is heated by gas from the digestion tank.

The Digestion Tank

The sludge digestion tank is constructed with reinforced concrete walls and floor. The interior diameter is 39 feet and the working depth 15 feet. The tank has a capacity of 18,000 cubic feet. It is equipped with a Downes floating cover and gas dome. The periods of digestion average 60 days. In order to reduce heat losses from the top of the tank, the backfill for two feet outside the tank from top to bottom was made as porous as possible with stones from 1 to 6 inches in diameter, and around the bottom of the outside of the tank were laid open tile drains leading to the sump, in order to keep the ground-water level below the bottom of the tank.

Leading from the gas dome in the floating cover to a small heater house constructed immediately adjoining the foundation of the sludge digestion tank is a gas hose which leads the sludge gas to the heater house. The gas passes through a water trap, a pressure regulator or relief trap, to a gas meter and thence through a flame trap to a burner under a regulation gas hot water heater. The water from the heater is pumped through a coil of 1½-



THE WEAVER STREET SEWAGE TREATMENT PLANT, MAMARONECK

1. The sedimentation tanks, the chlorinator and sludge pump house, and the sludge storage tanks in the background. 2. The sludge digestion tank with floating cover and the building housing the heater and meters. 3. Interior, showing the heater burning gas from the digestor, with water and gas meters and the recording thermometer on the wall. 4. Detail of the sludge hose connection from the floating cover to the sludge line

inch copper pipe which has a length of 112 feet and a surface area of 56 square feet. This pipe is located in the sludge tank two feet from the side walls and three feet from the bottom. On this hot water line a meter is installed, as well as a circulating pump and two thermometers, one at the inlet and the other at the outlet of the boiler. A registering thermometer has been installed with a bulb in the center of the sludge in the digestion tank. The temperature of the sludge is maintained at 78 degrees Fahrenheit. The temperature of the raw incoming sludge is about 55 degrees Fahrenheit.

Hydrogen Ion Control

Very little trouble has been experienced with acid conditions in the sludge. The sewage as received at the plant is never more than a few hours old and has an average pH value of 6.9. The digestion tank without any addition of lime will maintain a steady pH value of 7 to 7.2. In one case only after continuous operation had begun was any lime added. This occurred when a large quantity of whiskey mash was received at the plant, at which time the pH value dropped to 6.1. It was soon brought back to normal with several applications of lime. The pH value is slightly lower in the winter time.

Gas Yield

Records over the last four months of 1930 show an average gas production of 2,400 cubic feet daily. This gas yield has run as high as 4,000 cubic feet per day, and during the late winter ran close to 3,000 cubic feet per day. It is probable that a complete record of the amount of the gas yield is not secured, as there are several ways in which the gas may escape. When new sludge is being pumped into the digestion tank, it is necessary to take the cap off one of the filling pipes, at which time a large amount of gas escapes. At times this loss of gas has been so pronounced that the operator has reported that the floating cover has settled as much as 2 inches, which would show a loss of about 2,400 cubic feet. There is also a loss of gas through the pressure regulator when gas is accumulating faster than it can be utilized. We are not satisfied that we are now using the best possible heating system, and it is quite evident that a decided economy in gas consumption can be made. If this is so, the amount of gas necessary for sludge heating can be materially reduced, leaving more gas for other uses. At present the sludge pumping and chlorine house are being heated with the gas. There has been no trouble from foaming in the sludge digestion tank.

Recirculation of Sludge

During the last four months of 1930, the operator in charge of the plant tried recirculating the sludge; that is, drawing the old sludge from the bottom of the tank and pumping it back into the top of the tank. This has the immediate effect of releasing more gas, but over a period of time it is very doubtful that it increases the total amount of gas produced. Recirculating caused some trouble with solids gathering at the surface in the gas dome. The advantage of recirculating is that it overcomes the tendency of the sludge to become compact or hard at the bottom of the tank.

It is essential for the continuous digestion of the sludge that the temperature be maintained at not less than 72 degrees Fahrenheit. With the tank equipped as described above, with a heating coil, temperatures of 78 degrees Fahrenheit were maintained throughout the winter of 1930-31, and sludge digestion was almost as speedy as it is in the hot summer months.

Prior to the installation of this digestion tank in 1928, there were complaints from neighboring houses because of odors. Since the tank was installed and the sludge has been thoroughly digested before being placed on the sand beds, there have been no objectionable odors and no complaints have been received. The sewage disposal plant is in the center of a thickly populated high-class residential district and within 500 feet of an exclusive suburban restaurant.

Sludge Storage

In order to have some flexibility between the digestion tank and the sludge beds, the three concrete tanks that were formerly built for sludge digestion have been utilized for storage tanks when necessary. Sludge is drawn daily from the sludge digestion tank and pumped to these concrete tanks, being stored there until such time as there is a sufficient quantity to cover the sludge beds to a satisfactory working depth. From these tanks the sludge flows by gravity to the sludge drying beds, with a loss of temperature of about 10 degrees from the digestion tanks to the sludge bed.

Sludge Drying

In 1927 a sludge drying bed was constructed, 18 feet, 6 inches wide and 91 feet long, giving an area of about 1,625 square feet. This bed is in the side of a hill, so that it was necessary to construct it with only one side of the roof of glass. The drying period in this bed was found to be about four weeks in the winter and about two weeks in the summer. The bed was built below ground surface and it was found that there was considerable delay in drying the sludge because of shadows.

In 1928, when there were many complaints from odors, it was decided to install the sludge digestion tank and it was thought advisable at the same time to install a forced-draft system in the first sludge drying bed, in order to overcome the saturated air conditions inside the glass cover, and to concentrate all the odors from the bed at one point for treatment if this was found necessary. The forced-draft system made a material saving in the time of sludge drying. It was found, however, that with the use of the sludge digestion tanks there were no objectionable odors to be treated. It was also apparent that complete digestion made a considerable saving in the time necessary for drying.

In 1930, owing to the increased population, the sewage flow was so great that an additional sludge bed was found necessary. This was constructed of such a size that it would, in conjunction with the old bed, balance the rest of the plant. The new bed consists of three compartments, each 32 feet 4 inches by 18 feet 9 inches, giving a total area of 1,800 square feet for the new bed. The filter bed consists of 2-inch broken stone 9 inches deep, then gravel graded from ¼- to ¾-inch to a depth of 6 inches, topping off with 4 inches of sand. The floor of the new sludge bed has a 3-inch drop from the back to the front of the bed, and at intervals of about 8 feet there is a channel 5 inches wide, starting at the level of the floor at the back

and depressed 2 inches below the surface of the floor at the front. This is covered with split vitrified pipe with open joints. The channels drain into a common vitrified pipe drain on the outside of the beds, leading to a manhole in an incoming sewer. Thus, the drainage water mixes with the incoming sewage and again passes through the sedimentation basin. After 12 to 20 hours on the sand bed, the drainage is practically complete.

Sludge is pumped onto the beds to a thickness of about 6 inches. The sides, ends and partiition walls of the bed extend 3 inches above the sludge level, but have their corners chamfered so that there are no shadows cast on the sludge. Care has been taken to eliminate all shadows, both fixed and floating. On the walls of the bed, there has been erected a superstructure of galvanized structural steel to carry the glass roof. The front wall of glass is two feet high and has hinged sash opening in, operated by a worm and worm gear mechanism to control the amount of air flowing in. The two ends are also glazed, and fitted with glazed doors. It was found possible to so design this new bed that its longitudinal axis would be east-and-west without disarranging the ultimate scheme for the entire plant. With this in mind, the lean-to type of roof was adopted, and the north wall of the bed was constructed of 4-inch hollow tile building block stuccoed on the outside to conform with the exterior finish of the remainder of the buildings, and painted white on the inside. The pitch of the roof is made 1 vertical to 2 horizontal, which is normal to the sun's rays during the winter months. The virtue of the solid north wall painted white is twofold. It intercepts the same number of rays as the bed itself and reflects a large percentage of the rays back onto the bed. Also, it prevents a radiation of heat that would occur through the northerly side of an A-type glass roof.

On the rear wall is a galvanized sheet iron air duct that extends through the end of the structure to the fan house and connects to a fan with a capacity of 10,000 cubic feet of free air per minute. This duct has vertical branches extending to within 6 inches of the surface of the sludge and to within 6 inches of the roof. Where these branches join the main duct, there are dampers that regulate the flow of air. When there is a bright day with a low temperature, the condensation of moisture on the glass roof is very pronounced. This is eliminated by adjusting the dampers to draw air from the underside of the roof, causing a current of air to flow from the hinged sash in the front wall up across the underside of the roof, which in a little while clears the condensation away, leaving the roof in a condition to better admit sunlight. Thermometers placed near the roof and also near the sludge bed showed that a drop in temperature from one to three degrees takes place near the roof, and that the temperature near the sludge is not affected and consequently the sludge is not chilled. By reversing the damper, the air can be drawn across the surface of the sludge if desired. Temperature differences between the outside and the inside of as much as 60 degrees have been observed. With an outside temperature of 20 degrees, the thermometer registered 82 degrees inside. Comparative temperatures are being observed on an A-type structure in the immediate vicinity to ascertain the benefits to be derived from this type of structure.

Down the center of the bed, supported on the partition walls and piers and 3 inches above the sludge, is a 30-inch gage track with a subway floor walk between the rails. On this track runs a swivel dump car of 18 cubic feet capacity, for removing the sludge. Just outside the end of the bed is a turntable, and beyond this is 150 feet of movable section of track, so that the dried sludge may be distributed to various points. The track is elevated so that sludge can be dumped into trucks directly from the car. At the present time the sludge is being taken away for fertilizer as fast as accumulated, but no income is being derived from it.

It has been found that the time necessary to dry the sludge to a condition where it can be ground up has averaged about fifteen days, but all the tests have been made since the middle of December, 1930. During the summer the drying periods will be materially reduced.

Well at Plant Furnishes Needed Water

When excavating for the construction of the various units of the plant a very large quantity of ground water was encountered. Inasmuch as the water bills for the sewage treatment plant were continually mounting, it seemed advisable to make provision to utilize the ground water. Consequently, a well was sunk near the sludge pump house. This well was made of five pieces of 42-inch reinforced concrete pipe each 4 feet long, sunk in the manner of an open caisson, making a well 20 feet deep. From this well a suction pipe was laid into the sludge pump house, where an Orberdorfer pump of a capacity of 5 gallons per minute against a 55-pound pressure was installed. The discharge pipe from the pump was laid to the bottom of a 300-gallon tank, which acts as a pressure and storage tank. A pressure-controlled switch was installed, so arranged that the pump would start at 50 pounds pressure and stop at 125 pounds pressure. The discharge from this tank was connected to the chlorinator with a pressure-regulating valve set to give a maximum pressure of 50 pounds on the chlorinator side. Embodied in the construction of the chlorinating machine is a pressure-regulating valve set for 45 pounds.

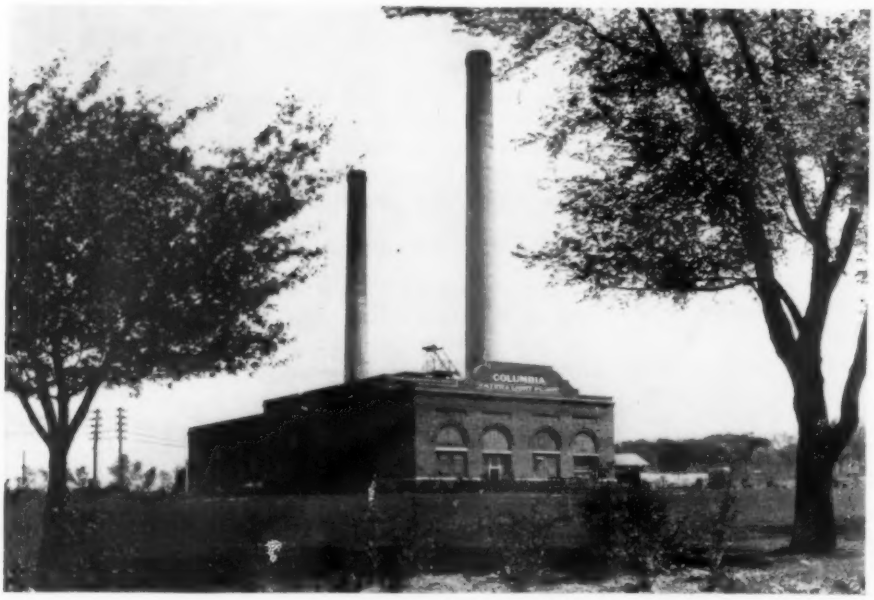
This water has been analyzed and it has been found unsuitable for any domestic use, so that it is used only for the chlorinator and for lawn watering. The cost of the well and pumping equipment was $1,420. The operating expenses plus interest and depreciation are estimated at about $15 per month, showing an average saving over purchased water of about $25 per month. One man, devoting about 75 per cent of his time to the plant, has entire care of the sewage treatment plant.

Conclusion

Additions to the original plant since 1921 have been constructed by various contractors from the designs and under the supervision of the A. J. Foote Engineering Corporation, with George E. Wright and Charles G. Burrows as Associate Engineers. The sludge digestion tank was constructed by the Erickson Engineering Co., of New York, which purchased the Downes cover from the Pacific Flush Tank Co. The sludge beds were constructed by Kuchar Brothers, Montvale, N. J., using the Barnes engineering Company's steel and glass roof enclosure.

ACKNOWLEDGMENT.—From a paper presented before the New Jersey Sewage Works Association at Trenton, N. J.

Municipal Utility at Columbia, Mo., Expands Steadily from Earnings



By **R. L. BALDWIN**
Member of Burns & McDonnell Engineering Co., Kansas City, Los Angeles

COLUMBIA, MO., has completely rehabilitated the municipal electric light and power plant and waterworks pumping station within the last two or three years. It has all been financed from the earnings of the two utilities, without having to resort to the usual bond issues and the necessary municipal elections required. Such elections require an educational campaign, are expensive and uncertain, and involve delays of months, and often years. The story of what they have done and the methods followed should be of interest to all cities owning and operating municipal power plants.

Columbia has operated the water and electric light and power utilities since 1904. Only a small portion of the investment was financed by bonds, and these have all been retired for some time, so that there are no interest charges to be paid.

The following bond issues were necessary during the early years:

Date	Amount
1904	$100,000
1905	10,000
1906	30,000
1910	125,000
	$265,000

Of this amount, $67,506.02 was the purchase price of the water and light property transferred from the private owner to the city in April, 1904. The remainder was used for improvements at the power plant and extensions to the distribution systems. Two hundred thousand dollars of these bonds were retired, and the interest paid by taxation. The remaining $65,000 was retired and interest payments made from the plant's earnings.

An appraisal prepared in 1930 showed a reproduction cost of these two utilities of $2,271,550, with a present value of $2,017,320. All financing of improvements and extensions, other than shown above, was from earnings. These earnings have been made at rates that compare favorably with those in other cities of the same size. The rates in effect for domestic use in 1930 were as follows:

WATER RATES

First 5,000 cu. ft.	30c per 100 cu. ft.
Next 15,000 cu. ft.	27c per 100 cu. ft.
All over 20,000 cu. ft.	25c per 100 cu. ft.
Minimum charge	60c per month

ELECTRIC LIGHTING RATES
(For Residential Use)

First 50 kwh. or less per month		8c per kwh.
Next 450 kwh. per month		7c per kwh.
Over 500 kwh. per month		6c per kwh.
Minimum charge		75c per month
Cooking rate	4c per kwh.	Minimum, $2.50 per month
Refrigeration rate	5c per kwh.	Minimum, $2.50 per month

Columbia is located in the central part of Missouri, and has a population of approximately 15,000. The State University and two large colleges for girls are located there, and have a total enrolment of between 7,000 and 8,000 annually; so, during nine months of the year the population is at least 20,000.

The original water supply was from a surface reservoir, and deep wells were drilled to supplement it. Now, deep wells are depended upon for the entire supply. The electric light system has been developed from the small high-speed, steam-driven units to a modern steam plant, using steam turbine generators, water tube boilers, forced draft, and mechanical means for handling the coal and ash. A large portion of the coal used is taken from local mines in order to support home institutions, although it is not equal to outside coal.

There were 3,880 water meters and 4,343 electric meters in service at the end of 1930. No charge is made to the city for fire protection or for flushing streets and sewers. There are 356 hydrants in service. No charge is made for street lighting, ornamental lighting standards, for traffic signals, lighting of the City Hall, police station and library, or for a large electric sign on the state highway.

These free services are worth between $35,000 and $40,000 per annum, if charged for at ordinary rates, and more than repay the original financing done by the taxpayers.

Excellent Financial Showing

The rapid growth in business and the increase in net earnings is shown in the following table, as are also the annual amounts expended on construction. The operating costs shown include depreciation, which in the last year was in excess of $50,000, and this money is actually available for extensions and improvements and is used to finance them. It should also be noted that the operating cost includes a payment of 2 per cent of the gross collections paid into the general fund of the city, and that this amounted to over $9,000 in 1930.

Date	Receipts for Water, Light and Power	Operating Cost	Net	Construction
1921	$202,461.53	$131,920.74	$70,540.79	$59,516.41
1922	223,338.72	157,786.10	65,552.62	77,511.93
1923	248,106.63	141,000.80	107,105.83	59,088.07
1924	262,731.58	134,809.43	127,922.15	168,524.38
1925	279,888.57	206,427.16	73,461.41	74,495.74
1926	306,563.97	204,799.53	101,764.44	120,905.71
1927	333,041.50	229,164.15	103,877.35	80,293.15
1928	374,635.19	251,143.92	123,491.27	163,329.93
1929	419,761.12	248,461.71	171,299.41	93,555.05
1930	465,562.08	265,694.04	200,468.04	268,290.79

The total excess of receipts over operating costs, including depreciation for the past ten years, was $1,145,423.31. During the past five years the depreciation included above was in excess of $200,000. The total construction for the ten-year period is $1,165,511.16, and the utilities are left with a surplus, including depreciation allowances, of approximately $200,000.

THE ELEVATED ASH TANK

Ashes, after being sluiced from beneath the boilers, are pumped into this tank, where they are left for eight hours. Water is gradually drained off, and the ashes are dumped into trucks for distribution on the streets

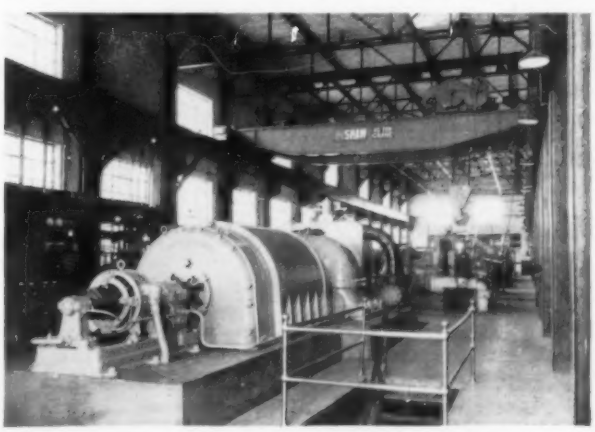
In 1924 the city retained the Burns & McDonnell Engineering Co. to prepare a report upon the improvements necessary at the power plant, and since that time this firm has been consulted as each improvement has been made.

The rapid increase in use of electric light and power made it necessary to add generating capacity. In 1925 an addition was made to the power-plant building, and in 1926 a 2,500-kva. turbo-generating unit was installed, together with a steam-turbine-driven exciter, for use in starting up if the plant should be completely shut down for any reason. Two 400-hp. boilers and a Zeolite water softener were installed at this time. The total cost of these improvements was in excess of $125,000.

The old water system was supplied by deep wells, first using reciprocating deep-well pump heads, and later using the air-lift method to lift the water to the surface. The engineers' report recommended that any new wells be drilled with a diameter bore large enough to install a motor-driven turbine-type pump. One new well has been drilled, and this well and one of the old wells have been equipped with motor-driven turbine-type pumps. This effected a saving of more than $5,000 per year in coal consumed. A 2,000,000-gallon concrete reservoir was built to give enough storage at this station. A large main has been constructed from the pumping station to the western part of the city, and a steam-turbine-driven centrifugal pump for high-service pumping has been installed. These improvements, made during the period from 1927 to 1930, cost approximately $125,000.

Capacity Again Increased

In 1930 it again became necessary to add generating capacity, and, after having an engineering report made, it was decided to raise the building roof so as to make it possible to install a crane in the turbine room, and so that modern settings could be provided on all new boilers. A 5,000-kva. turbo-generator was installed, and a complete new switchboard of modern design, with solenoid-operated switch gear, replaced the old equipment. Two new 600-hp. boilers were installed with forced-draft chain grates, and the steam pressure was increased from 155 lbs. saturated steam to 180 lbs. steam pressure, with 100 degrees of superheat; thereby decreasing the steam consumption approximately 25 per cent. A coal-handling system consisting of a 100-ton inside bunker of the suspended type, a skip hoist, a track hopper and a drag conveyor for reclaiming stored coal and handling local coal (which is brought to the plant by truck and crushed) was also installed, replacing the old method of handling coal entirely by hand.



THE TURBINE ROOM

In the foreground is the new 5,000-kva. Westinghouse turbine

An ash-sluicing system also replaced an old steam-jet system, eliminating large steam waste and the dust nuisance, which was particularly bad with the old system. All these changes were made with no interruption of service. Old walls were underpinned, and the foundation was carried down so that basement space could be provided for all parts of the building as new equipment was added.

The approximate costs of these improvements follow:

Power-plant building improvements	$70,000
40-ton crane	5,500
5,000-kva. turbo-generator	81,500
Switchboard and wiring	20,000
2 660-hp. boilers, superheaters, stokers and fans	67,000
Coal-handling equipment	18,000
Ash-sluicing equipment	25,000
Total improvements	$287,000

These improvements will give the power plant and pumping station ample capacity for some time in the future, and also will result in material savings in fuel and labor costs.

When it became apparent that there would be ample money available to finance all improvements contemplated, the city had a complete appraisal made of the two utilities, also a study of the rates to determine the reduction that was possible. This was brought about by an appeal to the Public Service Commission for a reduced rate—there being some feeling that profits were too large and that the customers should be favored with lower rates.

New Rates Devised

In considering a new rate it was planned to keep rates sufficiently high to provide the capital necessary for the ordinary extensions and additions required to the distribution system each year and to provide an ample allowance for depreciation. On this basis it was found that the water system was earning only sufficient to take care of these needs over and above its actual operating expense; but the electric light and power rates were found to be too high, and a reduced rate was recommended and put into effect in December, 1930, which will result in a reduction of income or saving to consumers of about $90,000 per annum. The following residential rates were put into effect, displacing the old special rates for cooking and refrigeration as well as the lighting rates:

First 30 kwh. or less per month	7c per kwh.
Next 30 kwh. per month	5½c per kwh.
All in excess of 60 kwh. per month	3½c per kwh.
Minimum charge	75c per month

These rates compare very favorably with those in effect in other cities of similar size, and the city's financial condition is to be envied by other communities. In the 27 years of city ownership, these two utilities have been built up so that the city now has a property worth over $2,000,000—debt-free—and has at all times given good service at reasonable rates.

An Attractive and Convenient Town Police Headquarters

THE new police headquarters building in Belmont, Mass., recently underwent an official inspection by the town officials. The structure is Georgian in architecture, two stories in height, of brick, and was designed by H. Thaxter Underwood and Chief John J. O'Brien.

Entrance is through a vestibule to the general office, where the booking desk is situated on a raised platform. To the left are the chief's private office and the clerk's room. Next to the corridor leading to the chief's office are the detention room, matron's room, and corridor leading to the women's cell room.

Directly opposite the desk are the guard room and stairs leading to the second floor. The guard room contains the officers' lockers, washrooms, and a clothes drying room. To the right of the desk is the entrance to the men's cell room.

On the main floor are the photographic room, dark-room, finger-printing room, and inspector's office. Adjoining this is the accident room. The men prisoners are brought in from the end of the building and are booked without coming into the general office and led directly to the cell room.

The second floor contains the sergeants' rooms, bedrooms, library, recreation room, and storage room. In the basement are boilers, garage, shooting gallery, and drill shed.

The equipment of the building includes teletype machine, fire-alarm bell and tape, and telephones.

House Number Signs

"TAKE house numbers. Even at high noon on a sunny day in June you can't tell exactly what the number of most dwellings, apartment houses, or stores is. For most of them, if visible at all, can't be seen without the assistance of the Lick Observatory, an equipment that the delivery wagon driver, the taxi chauffeur, and the ordinary visitor are not equipped with. Now there is a New York ordinance about visible numbers, but it is more unenforced than the law against selling vinous, malt, or intoxicating liquors. Why? I don't know, except perhaps that there is no graft in the enforcement of the visible number ordinance. Certainly no Mayor could ride into office on a visible-house-number platform. There is no office of visible house number enforcement. All that visibility of numbers would do would be to make things easier for everybody. That is not enough; it is nothing." F. P. A.

(In introduction to "House Number Signs," by Joseph W. Nicholson. See department of Municipal and Civic Publications.)

Montclair's Vigorous Year-Round Program for Clean Streets

By ARTHUR P. HEYER
Director, Bureau of Engineering, Street Lighting, Refuse Collection and Water Supply, Montclair, N. J.

THE SEVEN-YEAR-OLD ELGIN SWEEPER IN OPERATION IN MONTCLAIR

MONTCLAIR, N. J., is a high-class suburban residential community with a population of 42,000. It stretches for five miles along the eastern slope of Watchung Mountain and is about 1½ miles wide. There is a difference in elevation between the high and low levels of nearly 500 feet.

Nearly all the cross streets are more or less hilly. Approximately 6 miles of these streets have grades of from 8 to 17 per cent, and represent a distinct problem in snow removal and in sanding during ice storms. There are slightly more than 90 miles of streets in Montclair, 12 miles of which are county roads, which are well paved and occasionally cleaned by the county, although the town supplements this work from time to time. There are 25 miles of fully improved and permanently paved town streets and 53 miles of partially improved streets, some without curbs. In many cases the penetration pavement does not cover the full width of the street, although the margins are maintained in good shape by the Road Department.

Notwithstanding the addition of a considerable mileage to the paved streets since the purchase of a motor pick-up sweeper in 1924, this machine alone has handled all the mechanical sweeping, although an additional machine will soon be needed.

COMPLETED PLOWING ON UPPER MOUNTAIN AVENUE

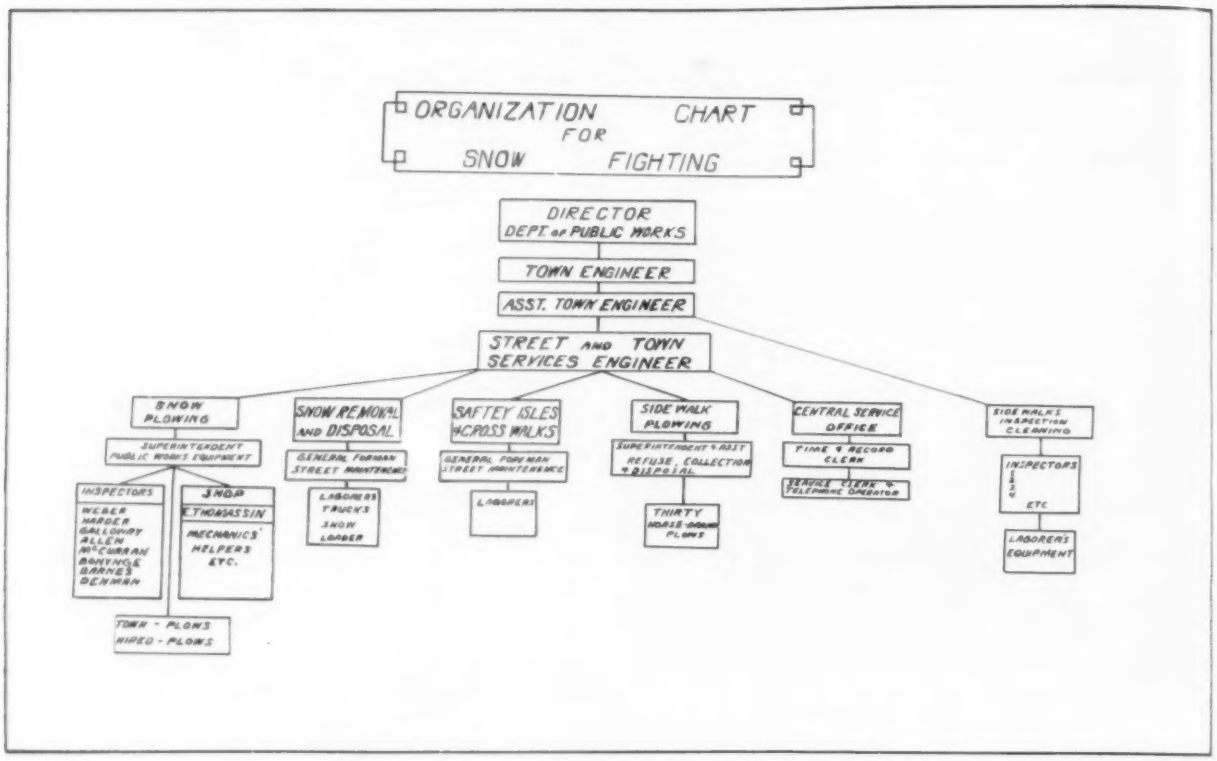
Costs of Machine and Hand Cleaning

During 1930 about 110 curb-miles of permanently paved streets were swept each week, or a total of about 4,300 miles for the 10 months in 1930 during which the sweeper was in operation. The total cost of this work was $11,868.19, which figures $2.76 per curb-mile. This includes the cost of the small unit which picks up the débris and disposes of it, comprising one truck, the driver and two men. Also the costs for about three weeks of several pieces of equipment and of about 30 men engaged in the removal of leaves from permanent pavements.

About 40 curb-miles of semi-improved streets are hand-cleaned each week, or a total of approximately 1,500 miles for the year. The cost of this work was $10,662.30, a rate of $7.11 per curb-mile. This figure cannot be compared with the cost per mile for mechanical sweeping, because hand cleaning includes maintenance of the shoulders and removal of leaves in the fall from all streets other than the permanently paved ones.

METHOD USED IN MONTCLAIR FOR CLEANING CATCH-BASINS

Regarding the use of hand labor, we have not been able to find any way to obviate this method on the semi-improved streets, as we have not found it practicable to use the pick-up sweeper on them. Our pick-up sweeper operates entirely at night, dropping its load of sweepings at predetermined places, from which the accumulation is picked up in the morning by a collection truck. It operates from 11 o'clock in the evening until 6 o'clock in the morning.



ORGANIZATION OF SNOW-REMOVAL FORCES IN MONTCLAIR

At this time there are but few parked cars on the streets, and the sweeper can do its work rapidly and completely. It has been found advisable to put four red lights on the back of the sweeper, as it is extremely wide. An automobilist does not anticipate that such a wide vehicle may be on the streets and, as a consequence, there were several cases of sideswiping before we started the present system of rear lights.

Snow Removal

"Vigorous" is the only word that completely describes our method of attack in snow removal. The plows are put out on the streets as soon as the snow is 3 inches deep. As all the streets are plowed from curb to curb, there is great economy in working while the snow is still soft and light. Any one examining our records might ask why we have so many plowing units. We find it cheaper to conclude the plowing within two or three hours after the storm has ceased and before the snow is packed down by traffic. Incidentally, our citizens appreciate finding the streets completely plowed shortly after the storm is over. There were few snowstorms in 1930-31, as a result of which the plows were called out four times only and the loader was not used at all.

The town snow-fighting equipment consists of nine truck plows with straight blades, one road grader, one tractor and a Nelson snow loader. In addition to the eleven town plows, seven plows, including five V-type plows, are operated by private trucking contractors, making a total of 18 plows for approximately 100 miles of streets. The V-type plows were found necessary for heavy or drifting snow, as they can be forced through deep snow that would stall a straight-blade outfit. Our road grader, with special wheels and tire chains, is used for streets with very steep

THE SNOW-PLOWING CONTROL CHART

grades, where it has proved superior to trucks. Of the total of 18 plowing units, two are held in reserve and for special assignments around plazas, etc.

The cost of snow plowing and snow removal for 1930-31 was $7,485.21. This amount includes the full value of services rendered by town equipment in connection with snow plowing and removal, even though such equipment is ordinarily used in other services. In fact, the eleven town plows are fitted to the rubbish, garbage and reserve equipment. It has been found that it pays to have a number of hired trucks from outside sources, because it is then possible to return the garbage and rubbish trucks to their respective services much sooner than otherwise and thus avoid seriously upsetting the collection service schedules.

For snow fighting, the town is divided into twelve areas or districts. Four inspectors, each with a motor car, follow up the plowing and report by telephone or in person each hour to the central garage, where, by means of colored stick-pins on a control chart, the information supplied by the inspectors is set up. Brown pins indicate one cut of the plow; orange pins indicate streets plowed two full cuts; blue pins indicate properly completed jobs, plowed from curb to curb; and red pins indicate plowing not up to the established standard. Thus, it is possible to see at a glance just how the plowing is progressing throughout the town. We consider snow fighting strictly an emergency service. The budget appropriation for it is set at a nominal figure, $12,000, and is not confused or tied up with any other items, and unexpended balances are returned to the town treasury. If the snowfall in any year becomes so great that the budget fund is insufficient, emergency appropriations are made as needed.

Kansas City, Mo., Approves Large Bond Issue Under Ten-Year Improvement Program

TWENTY bond issued totaling $39,950,000 were authorized by the voters of Kansas City, Mo., on May 26, by a vote of nearly four to one. The various proposals were the result of a careful study made under the general auspices of a Civic Improvement Committee of 1,000, representing all civic organizations in the city and county and working in cooperation with the city government. The projects studied—600 in number—represented a total of over $300,000,000. Sixteen subcommittees pared this down to $71,000,000, which was afterwards reduced to the twenty proposals voted upon, all of which were approved. The actual issue of city bonds is expected to be made in approximately equal annual amounts. Including $10,000,000 of school bond issues not yet submitted, the $49,950,000 ten-year program is $2,700,000 less than the total of bonds issued between 1920 and 1930. The planning of a ten-year schedule is in line with the growing recognition that a city working under a comprehensive, coordinated plan of improvements can best assure itself of a well-rounded scheme of physical developmnt, can guard against hastily conceived and ill-advised projects, can conserve its capital funds by directing their expenditure to the best advantage and can safely adjust its public works program to the broadest needs of the community.

In order to make the experience and information gained by the Civic Improvement Committee continuously available to the City Council and the City Manager, Conrad H. Mann, General Chairman of the Committee and President of the Chamber of Commerce, has appointed a Citizens' Advisory Committee of nine, at the suggestion of the Council.

In addition to the bonds, it is estimated that special benefit district assessments, largely in the trafficway program, will amount to about $10,000,000. No trafficway or boulevard projects involving special assessments will be instituted during the first two years, excepting on demand of the owners in the benefit district affected.

The authorized issues, with brief descriptive notes taken from the Kansas City Citizens' League *Bulletin*, are as follows:

City Bond Proposals, $32,000,000

1. *City Hall and Site*, $4,000,000.—The present City Hall endangers loss of invaluable records. The fire hazard is great. A respectable court room and police headquarters are needed. The money now paid for outside rentals would pay the interest on the proposed bond issue. Present insurance is $10,000 per year.

2. *Playgrounds, Parks and Boulevards*, $2,750,000.—For more playgrounds, first unit of a modern zoological garden, general improvements at Swope Park, Union Station improvements, approach to Nelson Gallery of Art, Brush Creek Parkway betterment, and to improve the Loose Memorial Park.

3. *Public Hospitals*, $2,000,000.—For improvements at the General Hospital, providing radium cancer treatment, a new isolation hospital, a home for colored nurses, and a new third floor for the Leeds Tuberculosis Sanatorium.

4. *Public Markets*, $500,000.—For a new, modern, sanitary city market on the ground occupied by the present City Market and City Hall; a truck farmers' market, and suitable parking facilities.

5. *Stadium and Outdoor Theatre*, $750,000.—For the original section of a stadium to seat 30,000 people, providing facilities for outdoor amusement and cultural events, athletic sports, concerts and operas.

6. *Fire Department*, $375,000.—For new fire-fighting apparatus, new fire stations and to still further reduce Kansas City's fire losses.

7. *Extension of Service of Police Department*, $125,000.—For new police stations as recommended by August Vollmer for the Leeds district, for the Woodland Avenue district and for the Sheffield district.

8. *Trafficway and Boulevard Improvements*, $8,300,000.—Includes connections of state and county highways with downtown districts; provides trafficways for increased population, and cost of land, grading and bridges; provides cost to be met by general city benefit bonds and by the particular property directly benefited and directly assessed.

9. *Blue River Protection and Parkway*, $1,000,000.—To guard against disastrous floods; to provide a continuous parkway from 15th Street to Swope Park, and a place for water sports, fishing and picnic grounds.

10. *Water-Works Extension and Softening Plant*, $3,500,000.—To install larger water mains and prevent water shortage; to cover water reservoirs and overcome the pollution of water; and to install a softening plant. The experience of cities having softening plants is that they promote health, reduce cost of soap and clothes, cut plumbing bills and are sources of great satisfaction to users.

11. *For a Municipal Auditorium*, $4,500,000.—To provide a place for all types of public exhibitions, school events, music programs and athletic events; to secure national conventions; to advertise Kansas City and to keep in line with other cities of our class.

12. *Sewers and Pumping Station*, $1,500,000.

13. *Improvement of the Municipal Airport*, $500,000.

14. *For Street Safety Improvements*, $200,000.—These include street signs, underpasses, safety islands, and safety zones.

15. *For Brush Creek Improvement*, $1,000,000.—To straighten Brush Creek, cement its bottom, and prevent stagnant pools from sewers that empty into it.

16. *For Garbage and Refuse Incinerator*, $1,000,000.—To provide for the disposal of garbage and trash and to prevent the nuisance of feeding garbage to hogs.

County Bond Proposals, $7,950,000

1. *Kansas City Court House and Jail*, $4,000,000.—Jackson County needs a court house wherein county records are safe from fire, a jail that is adequate to meet present and future conditions, in a combined building of such architectural proportions as will properly represent the county and city.

2. *Remodeling Court House at Independence*, $200,000.—The Independence Court House was built in 1872. It is substantial but needs repairs and further protection of the county records against fire.

3. *New Detention Home and Site*, $250,000.—A suitable county building is needed for temporary quarters for wards of the court. The present building is inadequate. It should be detached from the courthouse and jail.

4. *For Jackson County Roads*, $3,500,000.—These bonds are to complete the county road system and for the construction of new bridges. The remaining 82½ miles of roads at present unfinished are provided for by these bonds.

The Iron-Removal Plant of the Kokomo Water Works

By F. P. STRADLING
Superintendent, Kokomo Water Works Co., Kokomo, Ind.

A VIEW OF THE AERATOR AND FILTER WASH WATER TANK, TAKEN FROM THE TOP OF THE STORAGE RESERVOIR

THE water supply of the city of Kokomo is taken from eleven deep wells varying in size from 6 to 16 inches. Eight of the wells are connected through 6-, 10-, 12-, and 16-inch lines to a 20-inch suction line which discharges into a receiving well below the surface of the water. The water from these eight wells flows into the receiving well by means of a syphon action with a vacuum maintained upon the line at all times, varying from 9 to 24 inches, depending upon the demand. The vacuum is maintained by a vacuum pump operated for a period of approximately 30 minutes three times a day, and oftener if the demand is above normal.

Two additional wells located about two-thirds of a mile east of the pumping station and equipped with Hill Tripp deep-well pumps, were installed in 1917. These wells are 16 inches in diameter with a 10-inch drop pipe and an 8-inch discharge. Each of the pumps is equipped with a 50 hp. two-phase, Lincoln motor with three-stage Cutler-Hammer starting equipment operated by remote control at the pumping station. Prior to the installation of the equipment for the iron-removal plant, these two wells discharged into the receiving well through a 16-inch cast iron line.

The additional well is a flowing well in the bottom of the receiving basin. The receiving basin is 15 feet in diameter and 50 feet deep.

Iron Removal Necessary

The water from the wells contains iron in solution with an average content of approximately three parts per million. This is sufficient iron to be troublesome in the distribution system and cause discoloration when a part of the iron becomes oxidized. In the new iron-removal plant the water is first pumped from the receiving basin and discharged over an aerator. A motor-driven deep-well pump of three million gallons capacity is used for this purpose. The unit is housed in a building constructed over the receiving well. The pump is driven by a 50-hp. Westinghouse 230-volt d.c. motor. The current for this motor is generated by a three-cylinder diesel engine generating set. The engine was built by the Fulton Iron Works, of St. Louis, and all of the electrical equipment, including generator and starting equipment, was manufactured by Westinghouse. The motor is a variable-speed motor ranging from 850 to 1,150 r.p.m., which enables us to have almost perfect control of the water delivered to the aerator.

The discharge from the low-service pump is connected with proper valves and check valves to the discharge from the two electrically pumped wells previously mentioned. This line carries the water to the aerator, and the water may come either from the receiving basin or from the electric-pumped wells as desired. The low-service standby equipment is a 2½-million-gallon Worthington triple expansion pumping unit which can be used for either high or low service. A low-service discharge from this pump connects to the 16-inch line to the aerator.

Aeration

A Bailey flow meter registers the water passing to the aerator. The recording instrument is located in the pumping station adjacent to the starting box and control of the electric-driven low-service pump.

The aerator consists of four series of coke trays with five trays in each set. The water is discharged over the top of the trays by means of a perforated pipe distributor system. It then flows down through the trays and is collected in a steel tank. The tank also provides the support for the aerator. The steel trays are approximately 5 feet by 2 feet, and the bottom of each is perforated with 296 15/16-inch holes. The trays contain the coke in order to completely film out the water and obtain the removal of the CO_2 and hydrogen sulphide present which holds the iron in solution in the water. The space occupied by the aerator and tank is approximately 12 feet by 16 feet.

A louver constructed of wood completely surrounds the

aerator to prevent the spray of water on the trays from being carried outside the tank by wind currents. A line is provided so that the aerator may be by-passed if desired.

From the tank the water flows to the filters through a 20-inch influent line.

Filtration

In the filter building there are six 750,000-gallon concrete rapid sand filters. Each filter is equipped with Simplex loss-of-head and rate-of-flow gages for convenience in telling when the filter should be washed and to give the rate of flow passing through the filter bed. Each filter has a sand area of 176 square feet. The filter bed consists of Red Wing sand 30 inches in depth and supported on a 15-inch layer of graded gravel. The gravel was obtained from Cape May, N. J. The filters are constructed of concrete throughout and are the false-bottom type of rapid sand filter. The filter strainers are the umbrella type and are placed on 6-inch centers over the false bottoms. The

THE AERATOR, FILTER WASH WATER TANK AND FILTER BUILDING, WITH THE STORAGE RESERVOIR IN THE FOREGROUND

filters discharge into a clear-water basin having a capacity of 120,000 gallons.

The filter wash water is supplied by a 50,000-gallon elevated steel tank 40 feet high. The wash water at the present time is averaging from 1½ to 2½ per cent of the total pumpage. The length of filter run between washing is about 30 hours. The average daily pumpage on high service is two million gallons. The filtered water is sterilized by using chlorine, which is applied by means of vacuum type chlorinators in duplicate.

The high-service pumps take suction from the clear-water basin. A storage reservoir of 750,000 gallons capacity operates in connection with the clear-water basin on a float valve.

The total capacity of the nine suction wells is three million gallons per day and the capacity of the two electric wells is two million gallons per day. In a recent survey by the National Board of Fire Underwriters we were given credit for a ten-hour run at a seven-million-gallon rate, which was based on the five-million-gallon well supply and using the available storage in connection with it.

Laboratory Control

Daily bacteriological tests are made on samples collected from the supply in the Water Company Laboratory. Regular determinations for iron are also made in order to know that the iron-removal plant is functioning properly. Complete removal of the iron from the water has been maintained since the plant was placed in service, and the consumers are very much pleased with the improvement in the quality of the water.

Costs

The entire plant, consisting of aerating system, filter plant, clear-water basin, wash-water tank, necessary pipe lines and sewer, cost $56,000. The low-service pumping equipment and housing cost $19,400, making a total expenditure of $75,400. The installation of the iron-removal plant made it necessary to install the low-service pumping equipment, and therefore the cost of this equipment should be included in the total cost. The total cost is at the rate of approximately $17,000 per million gallons capacity.

The plant has not yet been in service long enough to have figures on the cost of operation. An estimate on the annual cost of operation, consisting of low-service pumping, labor, maintenance, depreciation, interest on investment, taxes and wash water, is $12,000 per year. On the basis of last year's pumpage, the estimated operating cost is at the rate of approximately $16 per million gallons, or $0.016 per thousand gallons.

ACKNOWLEDGMENT.—From a paper presented before the Indiana Section, American Water Works Association.

INTERIOR OF THE FILTER BUILDING

Chicago Adopts Noise Control Ordinance

FOLLOWING the precedent set by New York City in putting a curb on unnecessary noises, Chicago recently adopted an ordinance, amending Article IV, Chapter L of the Municipal Code, as follows:

There shall be and there hereby is created in and for the city of Chicago, a commission to be known as the Noise Commission of Chicago, the members of which shall be appointed by the mayor with the approval of the city council. Said commission shall consist of the commissioner of health, five members of the city council and such other persons as the mayor shall appoint with the approval of the city council.

The term of office for the members of said commission shall be three years and until their successors shall be appointed and qualified. It shall be the duty of the commissioner of public works to assign suitable quarters, without charge, to said commission.

The members shall serve without compensation.

It shall be the duty of said commission to investigate the causes, sources and effects of unnecessary noises in the city of Chicago, and to make recommendations to the commissioner of health or the city council for their prevention or abatement.

This ordinance shall be in full force and effect from and after its passage and due publication.

Water Softening Included in the New Fort Wayne Water Supply

By **R. L. McNAMEE, M. Am. Soc. C.E.**
Principal Assistant Engineer,
Hoad, Decker, Shoecraft and Drury,
Consulting Engineers, Ann Arbor, Mich.

THE present municipal water supply of Fort Wayne is drawn from wells and pumped into the distribution system at a number of independent stations situated throughout the city. The system has grown from a single station with gravel wells about 70 feet deep to a system of deep rock wells, some of which are over 600 feet in depth. The addition of new wells and pumping stations at different points in the city kept pace for a time with the city's growing water-supply needs, but for several years past the development of additional supply has not been as rapid as the city's growth in population and industry. It is now apparent that the practical limit of this form of development has been reached, while at the same time the water needs of the city and its industries, already beyond the capacity of the present system, are steadily increasing.

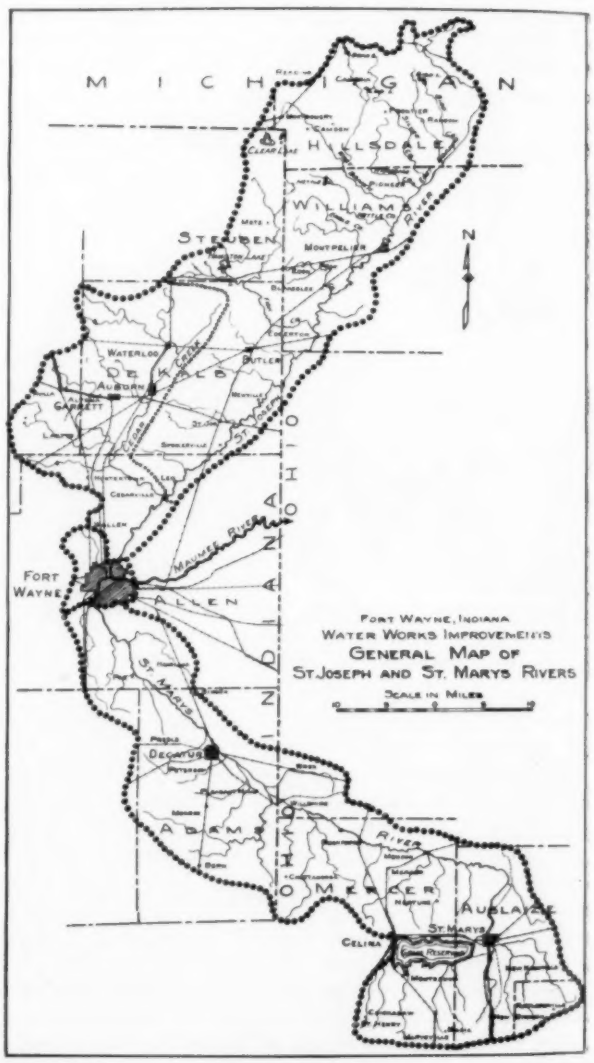
The total dependable and continuous yield of the present system is indicated to be not over 12 million gallons per day, and there is convincing evidence that the yield of the field is slowly diminishing on account of the heavy overdraft made upon it by both city wells and industrial wells. If some further developments are not made soon, the yield from the present city wells may be expected to slowly diminish until an annual average yield of not more than 8 million gallons per day is reached.

The water drawn from the wells is excessively hard and some of it contains objectionable amounts of iron, and, in a few cases, hydrogen sulfide. Pollution from surface drainage has required the shutting-down of one station at times. The hardening constituents consist almost wholly of mineral compounds of lime and magnesium, which have been dissolved from the rocks and soils through which the water has passed in its long journey from the spot where it fell as rain, to the city wells. The average of the total hardness of the water from all wells is about 544 parts per million, of which about 344 p.p.m. is carbonate hardness and the remaining 200 p.p.m. is noncarbonate hardness. This is an excessively hard supply as municipal supplies go. The burdens which it imposes upon both householder and industry are keenly felt, and the citizens of Fort Wayne have indicated a desire for a softer supply.

Estimates for Future Needs

The Federal census for 1930 determined the population of Fort Wayne at slightly over 115,000 people. A careful estimate of the future growth of the city indicates that the city may expect to have a population slightly in excess of 150,000 in 1940, 175,000 in 1945, and 200,000 in 1950.

In past decades the development of the industrial life of the city and the growth of its commerce and trade have been even more rapid than its increase in population. It is generally recognized that Fort Wayne possesses many fundamental advantages as an industrial and commercial center, such as its wealth of railroad facilities, its two



independent sources of dependable and low-priced electric power, and its great natural benefits in the way of topography and excellent geographical location. Its present standing is well established and its future position seems assured.

The use of water in Fort Wayne has been limited in the past by the inadequacy of the supply and the shortcomings in its quality. The average daily rate of consumption for 1929 is only about 86 gallons per capita. This low per capita rate is due in considerable degree to the fact that the water consumers have not had all the water they would have used had it been available. The generous use of

water on lawns and gardens has been discouraged rather than promoted, the quality of the supply has been hard and in some cases objectionable in other respects, and the pressures have been inadequate and uneven. For the same reason the industrial use of city water has been comparatively small and many industries have developed their own private supplies instead of taking water from the city mains.

For the future, under conditions in which an abundant supply of soft water will be available under good pressures, the per capita use of water may be expected to be somewhat greater. The table below summarizes the estimated water requirements of the city for the next twenty years:

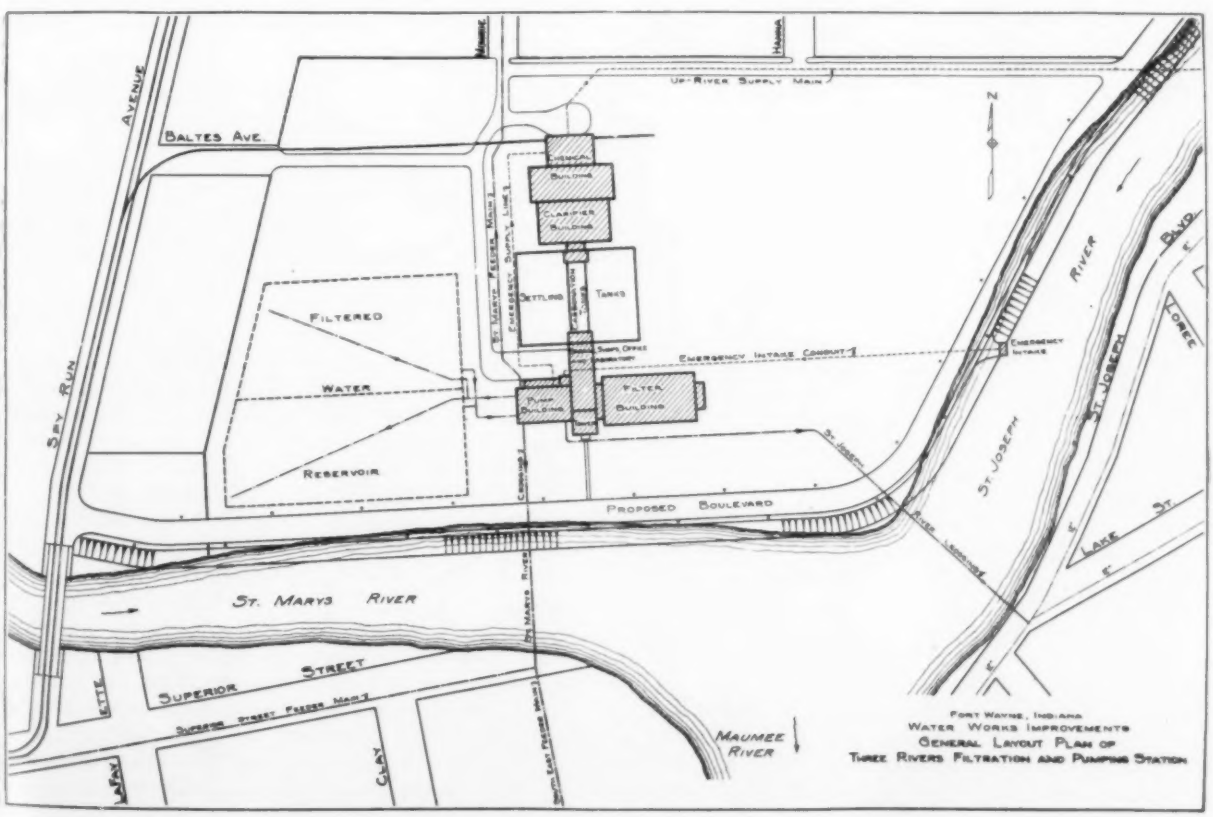
Year	1935	1940	1945	1950
Estimated population	133,320	153,860	177,090	203,300
Daily per capita consumption rate, av. for entire year; gal. per cap. per day	102	104	105	106
Daily total pumpage, av. for entire year; mil. gal. per day	13.6	16.0	18.6	21.5
Average daily pumpage during max. month; mil. gal. per day	17.0	20.0	23.2	26.9
Total pumpage on max. day, mil. gal. per day	21.8	25.6	29.8	34.4
Max. hourly demand rate for all purposes, including N. B. F. U. requirements for a max. fire; mil. gal. per day	54.6	62.1	70.5	79.6

An Additional Supply from the Ground

The present city supply of ground water is taken from a thin deposit of magnesian limestone, locally called "water lime." The catchment area of this water lime, and therefore the area which contributes more or less to the city wells, appears to be about 400 or 500 square miles in extent, and to reach in a crescent-shaped area from near Fort Wayne to near Decatur, Ind., with the outer arc of the crescent passing through Huntington. This tributary area is large enough to supply considerably more water than the quantities which are now taken from it by the wells at Fort Wayne, but the cost of developing groups of additional wells, at points far outside the city and far enough away to avoid interference with the present wells, is so high as to put any such plan out of consideration.

The water is of poor quality, having a total hardness of about 550 p.p.m. The water could be softened, but only with difficulty and at great expense. The nature and quantity of the hardening constituents are such as to require costly amounts of chemicals for their removal. The cost of pumping and conveying the water from a number of widely scattered wells and pumping stations to a common center, where softening and iron removal could be accomplished, and the repumping through the distribution system, would be very heavy. For these reasons it must be concluded that the rock-well sources cannot be made to yield an enlarged and wholly satisfactory supply of water for Fort Wayne needs.

The existence of many deposits of water-bearing sand and gravel in the glacial drift of northern Indiana encouraged the hope that some large water-supply source of this nature might be discovered, and a very careful and extensive survey of the gravel-bed areas in the vicinity of Fort Wayne disclosed the fact that such water-bearing gravel areas do exist, but their size and extent are so limited that a dependable continuous yield of not much more than 5 million gallons per day might possibly be developed. The quality of the water from the gravel is much better than that from the rock wells, but it still must be classed as excessively hard. The average total hardness is found to be about 350 p.p.m., of which about 300 parts appear as carbonate and about 50 parts as non-carbonate hardness. The inevitable conclusion from all the extensive and thoroughgoing surveys which were made of



ground-water resources in the vicinity of Fort Wayne is: that all of the water from underground sources is excessively hard, some of it with objectionable quantities of iron; that the city and industrial wells have already developed and are now utilizing as much as the deep rock sources in the immediate vicinity can be depended upon to yield; and that the scattered gravel beds of the region are not worth developing except in a limited way and for local uses.

Surface Water Studies

After the disclosure of the unfavorable conditions for the development of additional supplies from ground-water sources, attention was directed to the available surface water sources.

Fort Wayne is situated at the junction of the St. Marys and St. Joseph Rivers, which form the Maumee. From the junction, the Maumee flows in a northeasterly direction to the western end of Lake Erie. The watershed, including the city of Fort Wayne, has a sewered population equal to about 72 persons per square mile of area, with 80 per cent of this population concentrated just above the only feasible point of intake. This condition is so highly undesirable as to put Maumee River out of consideration as a source of supply.

The St. Marys River, the southern branch of the Maumee, rises near the town of St. Marys and the Grand Reservoir in Ohio. From there it flows in a general northwesterly direction through Ohio and Indiana to Fort Wayne. The area of the drainage basin of St. Marys River at the Fort Wayne city limits is about 870 square miles. Upon this area there is estimated to be a total population of about 52,000 persons, of which some 12,200 are served by the regular sewerage systems, making a sewered population of about 14 per square mile. The water of the river during the low-water season has a total hardness of about 280 p.p.m., of which 135 parts are carbonate and 145 parts are non-carbonate hardness. The discharge of the river is known to vary greatly and very few definite and dependable data are available. It is estimated that the river flow occasionally drops as low as 25 cubic feet per second, with an average of 30 or 35 cubic feet per second for a minimum month.

The St. Joseph River heads in a number of spring-fed lakes in the southern part of Hillsdale County, Mich., and Steuben County, Ind. From the headwater district the river courses in a general southwesterly direction to Fort Wayne. The only important tributaries are those from the west, of which Cedar Creek, joining the main streams at Cedarville about 8 miles north of the city limits of Fort Wayne, is one of the principal ones. St. Joseph River has a total watershed area, measured north of the city limits of Fort Wayne, of about 1,110 square miles. Upon this watershed is a sewered population of 17,000 persons, equivalent to about 15 per square mile. The quality of the water in St. Joseph River as it enters the city shows a hardness of about 300 p.p.m., of which 260 parts are carbonate and 40 parts are non-carbonate.

The very extensive surveys and studies and analyses which have been made of these surface waters cannot be adequately described here, but from the results of this work the following conclusions were reached. Maumee River would furnish a supply sufficient in quantity for Fort Wayne, but it must be eliminated from consideration because of the pollution it bears. As between St. Marys and St. Joseph Rivers, the latter is preferable from every point of view, and St. Joseph River above Cedar Creek is from every consideration the best source available. The area of the watershed of this upper part of the St. Joseph basin is sufficient to supply the needs of the city for an indefinite time in the future, provided one or more additional impounding reservoirs are built as the demand becomes greater. The population on the watershed is comparatively small and is widely scattered over the entire watershed in small villages and rural homes. The quality of the water is fundamentally good, and the surrounding conditions make it easy to protect and conserve this supply for future use. The water can be made entirely suitable for municipal use by standard methods of filtration and softening, and at reasonable cost.

The Value of Water Softening

Although the water of the St. Joseph River above Cedar Creek is only about half as hard as the water from the present city wells, it is still hard enough to amply justify the small additional expense of softening. In the following table the water proposed to be used for Fort Wayne is compared in hardness with the waters of other rivers which are used as sources of water supply by other cities and which are softened by them before distribution to the consumers:

		Hardness of Water, before Softening, During Ordinary Low-Water Stages of the River		
City	Source of Supply	Total Hardness p.p.m.	Carbonate Hardness p.p.m.	Non-carb. Hardness p.p.m.
Fort Wayne	St. Joseph River*	275	240	35
Defiance, Ohio	Maumee River	230	170	60
Piqua, Ohio	Delaware River	260	230	30
Grand Rapids, Mich.	Grand River	260	210	50
Newark, Ohio	Licking River	270	200	70
Flint, Mich.	Flint River	275	225	50
Springfield, Ill.	Sangamon River	300	255	45
Columbus, Ohio	Scioto River	300	190	110
Saginaw, Mich.	Saginaw River	300	180	120
Midland, Mich.	Tittabawassee River	350	170	180

* Softening proposed.

The science and art of water softening on a large scale has been greatly improved in recent years, while the cost of the treatment has materially diminished. The water of the St. Joseph River above Cedar Creek presents no serious problem in its softening. It is, in fact, of such character that it may be softened to a satisfactory degree by the use of lime alone without employing the more costly treatment with soda ash or zeolites.

The value of softened water is readily understood and appreciated by the industrial consumer, for its savings in steam generation, laundry work, dye work and other processes in which the natural hardness of water has a detrimental effect, but it is also of great value to the individual householder, and the savings which will result from the softening of water on a municipal scale can be easily shown. The cleansing action of soap in water requires first that the hardness of the water be neutralized by the soap. This is a commonly understood fact, for a hard water is known to require greater quantities of soap than the soft water. Until the hardness of the water has been neutralized by the soap, no lather can be secured to do the actual cleansing. It is conservatively estimated that on the average every individual uses at least one gallon of water for cleansing purposes each day, or a total of 365 gallons per capita per year. Using the water from the present rock-well sources in Fort Wayne with a hardness of 544 parts per million, and assuming that the water is

softened by no other means, each individual would thus use about 50 pounds of soap per year. The average retail cost of soap may be fairly estimated at 12c per pound, so that the total soap cost may be estimated to amount to about $6 per capita per year.

The total cost of operation and the fixed charges upon the investment of those parts of the proposed new filtration and softening plant at Fort Wayne which effect the processes of softening is estimated at about $120,000 per year. This plant will have a capacity sufficient to serve the city until it reaches a population of 150,000 persons. At that time the cost of softening will thus amount to about 80 cents per capita per year. In the early years with a population of about 120,000, it will be about $1 per capita per year. The water produced by this plant will have a remaining hardness of approximately 100 p.p.m., and every gallon of the water produced will be reduced to this hardness. The use of soap with this softened water to the extent of about a gallon per capita per day will amount to about 8 1/3 pounds of soap per capita per year, which at 12 cents a pound will cost about $1. The cost of general softening, $1, plus the cost of soap, $1, thus bring the total cost to the individual to an amount of $2 per year as compared with the $6 per year, if no means of softening other than soap are employed. In this comparison it must be borne in mind that with the use of the municipal softening plant water the entire volume of water is reduced to a hardness of 100 p.p.m., so that the benefits of the partially softened water are available to every consumer upon opening the tap. These benefits, calculated in dollars and cents, to the industrial consumers would show a much greater proportional saving. There need be no hesitancy in making the statement that municipal water softening in the ordinary case will pay for its cost several times over.

The Plan for the New Supply

The plan of development for the new water supply of Fort Wayne involves the impounding of the excess flow in the St. Joseph River above Cedar Creek, the bringing of the supply from this point a distance of ten or eleven miles to the city, the operation of a central purification and pumping plant in the city, and the distribution of the purified water from this point to all parts of the city under higher pressures than those now used.

The up-river station at which the water will be taken from the river and pumped into the supply main will consist of a low-head dam and small pumping plant with their various appurtenances and equipment. The elevation of the dam will be slightly above that of the downtown plant, but not sufficiently so to eliminate the need for low-head pumping. The dam will create and maintain an excellent river pool for the intake and will impound sufficient water to insure an adequate supply to the city until such time as the purification and pumping plant will have to be enlarged. When this becomes necessary, additional impounding reservoirs may be built further up the St. Joseph to store water and feed it down to the lower dam as required.

The supply main through which the water will be delivered from the up-river station to the purification and pumping plant will be laid for the most part along public highways in the most feasible direct route. The first installation will have a capacity of about 24 million gallons per day, and will be furnished with gates and cross-connections at suitable intervals, so that it may be made to work in harmony with another main to be laid alongside it at a later date when a larger capacity is needed.

The downtown plant will be built on city property at the junction of the St. Marys and St. Joseph Rivers. The water will be received at the mixing tanks, in the chemical building at the north end of the plant, where it will be quickly mixed with the lime and alum employed in the softening and purification processes, and immediately passed on to the coagulation tanks. In these tanks the water will be kept in motion by slowly rotating arms for a period of about an hour, during which the softening reaction is allowed to take place. In this process the hardening constituents of the water and the lime and alum, which were mixed into it as purifying agents, will interact and form insoluble matter which is coagulated into larger fragments. From the coagulation tanks the water will flow into clarifiers in which the heavier and more easily settled material will be precipitated, and from which the settled precipitates will be continuously removed and pumped away. The finer and lighter particles of sediment, which require a longer period of time in which to settle out, will be removed in the final settling tanks. These tanks will receive but a small part of the sludge and will be emptied and cleaned occasionally as necessary.

After passing through the settling tanks, the water will be stabilized by having carbon dioxide gas pumped through it. This stabilization process will prevent any damaging incrustation of the filter sand and will insure against any after-deposits of lime carbonate in street mains and house plumbing. The plant will be so designed that the excess lime treatment with secondary carbonation may be employed.

After leaving the settling and carbonation tanks, the water will be filtered through rapid sand filters. The first construction will have a nominal capacity of 24 million gallons per day. The effluent from the filters will be carried in underground pipe lines to the filtered-water storage reservoir, an underground concrete tank having a holding capacity of approximately 20 million gallons. The entire structure will be below ground covered with earth forming a broad and level lawn. The high-pressure pumps will draw their supply from the filtered-water reservoir and pump it to the city through the feeder mains to meet the demands for water.

The central part of the main building will have space for offices, chemical and bacteriological laboratories, shops and garage. The wash-water tank for holding the supply of water used in washing the filters will be housed in the upper part of the tower of the building entrance.

The building is to be made an architectural monument. The design is based on Indiana limestone for the exterior with a structural framework of reinforced concrete and steel. The design will take full advantage of the favorable setting upon which the plant is to be built and will greatly enhance the beauty of the rivers and park in its vicinity. The main entrance to the plant will be from a lighted roadway along the river bank. The grounds between and around the structures will be graded up, landscaped and planted in harmony with the building plan.

The estimated cost of the proposed improvements, including the up-river dam, raw-water supply line, the downtown purification and pumping station, and the feeder mains, is about $2,750,000. The construction is to be

financed mainly from a bond issue which was authorized by ordinance of the Common Council of the city of Fort Wayne December 29, 1930, and was approved by the Public Service Commission of Indiana on December 31, 1930. The interest and bond retirements and the operating costs of these improvements are to be paid for out of water-works revenue, for which purpose a readjustment of rates has already been effected. Once in operation and under full load, the proposed new plant is expected to show a cost of water delivered to the consumer less than that now borne by the operation of the present plant, notwithstanding the fact that the water will be softened and purified.

The nominal capacity of the units to be included in the present construction is set at 24 million gallons per day. Under favorable conditions, or in case of necessity, any of the plant elements could be pushed somewhat beyond this capacity for short periods of time. The forecast of water requirements in Fort Wayne indicates that a capacity of 24 million gallons per day will be reached by the year 1940. Whenever this capacity is reached, the system must be enlarged, for which the following provisions are made:

Additional impounding reservoirs will be built on the St. Joseph River above the first reservoir, by which the springtime run-off can be impounded. The water as needed can be passed from the up-river reservoir down the river to the lower reservoir without building pipe lines for this purpose.

An additional supply main can be built alongside the first one from the lower reservoir to the downtown plant.

Additional mixing, coagulation, clarification, settling and filter units can be built in areas provided for that purpose at the downtown station. The pumps first installed may be replaced with larger units as the demand for this equipment increases.

Additional feeder mains may likewise be built as the demand on the distribution system increases.

The program of water-works improvements is being carried out under the administration of the Mayor and the Board of Public Works. The engineering plans and specifications for the entire project are in the preparation by Hoad, Decker, Shoecraft and Drury, consulting engineers of Ann Arbor, Mich., from whose preliminary report many of the data and the drawings presented in this article are taken. While no construction contracts have yet been awarded, it is the intention to employ local labor and materials so far as practicable upon this work, and it is certain that the undertaking of this project at this time will do much to relieve the unemployment situation in the vicinity of Fort Wayne.

ACKNOWLEDGMENT.—From a paper presented at the annual meeting of the Indiana Section, American Water Works Association.

Keeping Public Reports Concise

TO THE EDITOR:

I have read with great interest the articles on "The Preparation of Public Reports," by Wylie Kilpatrick, which appeared in the April and May issues of THE AMERICAN CITY. These contain splendid suggestions for proper methods in report-making.

I believe the public today is willing to give little time to the reading of public reports. For the busy business man and the general public, short articles or news boiled down—international, national, and city news—is becoming more popular each day.

My own pamphlet, "Facts about the City Government," is not propaganda, but actual fact. The placing of this leaflet in tax bill envelopes, and sending "Facts about the Water Department" with water bills, have apparently been appreciated by the taxpayers of Portsmouth. It causes them to be interested in the government and to feel that the government is interested in them. Possibly a longer statement would not be read.

Early in this school year I appeared before the faculty of our High School to discuss municipal government, and stated that I should be willing to put a course in government in the school during the year—to furnish a speaker at least twice a month to talk on the various branches of our municipal activities. This has been done. Approximately 1,500 High School students meet in the auditorium at least twice a month and are told facts about the operation of the city government.

No public official should cheapen his government with propaganda. Most people use the average report more as record than anything else. It should therefore be made short and to the point. It should take the public into confidence. You, as an editor, doubtless know that it is somewhat hard to determine what information would be interesting to the public. What might be interesting in one section of the state or country would be entirely uninteresting in another. Public opinion is molded differently in different places. Public reports, likewise, meet with different reactions. The best report that can be made by a city, in my opinion, is made by keeping records straight. It is the public's business that public officials are transacting; and it should be open to the public at all times. Give news. Let facts be substantial and not of the braggadocio type. Avoid being sensational, and above all things avoid lengthy reports either to the public or to the council, if you expect them to be read. However, I do not mean it to be construed that department reports should not contain the full facts, although they may be lengthy. I am speaking largely of reports that go to the public, as all reports are open to the council at all times.

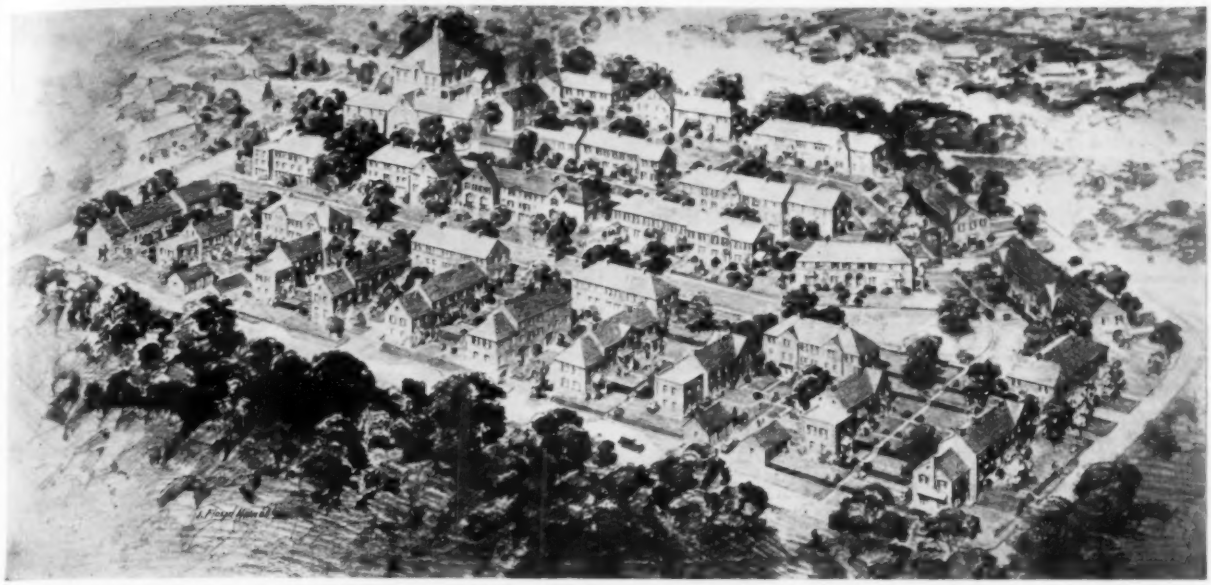
FRANK C. HANRAHAN,
City Manager, Portsmouth, Va.

Protecting Vacant Property

AN organized effort to prevent the looting of vacant houses and business property of fixtures and equipment is being initiated in Portland, Ore., by the Portland Realty Board in cooperation with the Portland Police Department and the Multnomah County Sheriff.

A certain amount of loss is constantly felt by owners of vacant property, and within the last few months hundreds of houses and buildings have been pillaged of plumbing and electrical fixtures. Often the value of missing property runs into hundreds of dollars.

The general committee which is working on plans of action against the looters expects to get the active cooperation of every owner of vacant property in keeping doors and windows locked securely. They will check also business houses which deal in used fixtures, in an attempt to stop the marketing of stolen equipment.



THE FIRST $1,000,000 UNIT OF THE 300-FAMILY PROJECT

Foundation to Make Housing Demonstration

By CHARLES F. LEWIS
Director, The Buhl Foundation, Pittsburgh, Pa.

INAUGURATION of a $2,000,000 home-building project, designed to demonstrate the feasibility of providing modern and desirable homes at rentals within the reach of persons of moderate means, was announced on June 3 by The Buhl Foundation, created in 1927 by the will of the late Henry Buhl, Jr., Pittsburgh department store owner. The Foundation has capital funds of $13,000,000, and in the last two years has made grants totaling $1,100,000 for basic research and social demonstrations in the Pittsburgh district.

Dwellings for 300 families are to be erected upon a 45-acre tract which the Foundation has purchased in the Mt. Washington section of Pittsburgh, a district easily accessible to the "Golden Triangle." Construction will be started at once. Homes for 125 families will be completed by May 1, 1932.

Less than 30 per cent of the entire tract will be occupied by homes. The remainder will be landscaped to provide large central parks running through the property, wide lawns and gardens around each dwelling, and for playgrounds equipped for young children. All such outdoor facilities are to be maintained permanently by the Foundation.

Plans provide that homes will face away from the public streets toward the central parks. The rear of each home is to have much of the appearance of the front. The same materials and design will be used, and rear grounds also will be landscaped for lawns and gardens.

It is not the purpose to offer the homes for sale. A permanent rental administration is expected to assure unusual security to the tenant and an exemplary standard of maintenance and management. Funds of the Foundation are to finance the entire project.

The Buhl Foundation is not entering into the program as a method of subsidizing housing, but as a commercially practical enterprise. Economies that will be possible through mass construction, the present low cost of building materials, and the intention to require only a reasonable and non-speculative return on its investment, will insure lower rentals.

Decision of the Foundation to enter the housing field is based upon a desire to make its funds do double duty. It was found that through this agency it would be possible to invest money directly for a constructive social purpose, without sacrifice of income and without unusual risk to the invested funds. Normal income will still be available for philanthropic programs of the Foundation, and thus capital funds as well as income can be used for the public welfare.

It is hoped that this activity will suggest to other foundations and to organizations possessed of endowments, the practicability of similarly investing their funds. Hundreds of millions of dollars in the United States which have been placed in trusts and endowments are now performing only a minimum of the service that would be possible if both capital and income were put to work in the public interest.

New principles in housing construction on hillside land which the Foundation will employ are also expected to show how much of what is considered waste land in Pittsburgh and other cities may be used while developing even higher standards of housing.

The architectural firm of Ingham and Boyd, of Pittsburgh, has been retained to design the homes; and Clarence S. Stein and Henry Wright, of New York, are to be the architectural consultants.

For reasons of economy only four basic floor plans have been adopted, but because of ground conditions a remarkable variety of appearance is being achieved by the architects. Homes will be of five, six, or seven rooms with a ground and a second floor. They will be built in units of from two to seven homes with sound-proof party walls between. The average cost per home, including the site and development, will be about $7,000.

The firm of C. L. Wooldridge, Inc., of Pittsburgh, has been engaged as engineers to prepare plans for grading, utilities, and paving. In addition to professional assistance, the Foundation is enlisting a national advisory council composed of persons of most prominence in the fields of town, community and home planning. This group is to include prominent citizens of many cities who have interested themselves in better housing from the standpoint of general social advancement.

Milwaukee Playgrounds, 1923-1940

What Long-Time Expansion Programming Has Already Accomplished, and Its Ultimate Objective

By **ELMER KRIEGER**
Board of Public Land Commissioners, Milwaukee, Wis.

CLEVELAND AVENUE PLAYGROUND
Planting screens hide the fencing and make the playground an asset to the neighborhood

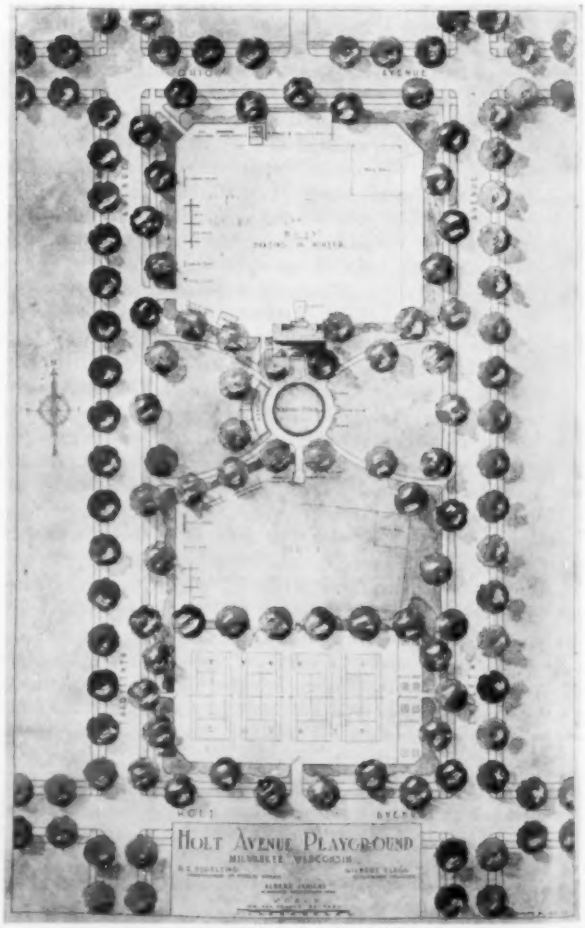
BACK in 1923, after considerable study, Milwaukee decided it needed more playgrounds. At that time it had 18, totaling 16.4 acres. Because these 18 playgrounds fell so far short of serving the entire city, a preliminary expansion program was prepared in 1924. The purchasing of new sites and the expanding of old ones under this preliminary program was practically completed by 1928. In that year a comprehensive twelve-year playground expansion program was prepared. It has for its objective the providing of an efficient and attractive playground within safe walking distance of every man, woman, and child, and also the providing of large areas to be devoted to baseball, football, and soccer for city use generally.

A total of $2,617,694 has been allotted during 1923-1931 inclusive for the development of the sites outlined in the programs. This amount covers the cost of the land and the cost of the construction of the playgrounds only; it does not include the costs of maintenance, operation, or supervision. This expenditure has increased the number of playgrounds from the original 18, with 16.4 acres, in 1923, to 49 playgrounds, with 136 acres, in 1931. The annual attendance increased from 330,354 in 1923 to that of 2,202,431 in 1930. The twelve-year expansion program, begun in 1928, if completed, will give the city 96 playgrounds including about 210 acres. The entire cost of the expansion from 1923 to 1930, excluding maintenance, supervision, and operation costs, would then be about $7,500,000.

The foregoing figures show that in the past eight years 31 playgrounds totaling 120 acres have been built. The annual attendance increased 480 per cent during that time. These figures give indication of the growing importance of the playground in Milwaukee life. Some authorities believe that in the future the playground system may equal the public school system in importance. It is a fact that the playground is a rapidly growing institution and with this growth have come newer and greater demands on the services supplied by it. The following will illustrate this.

The Playground of 1923

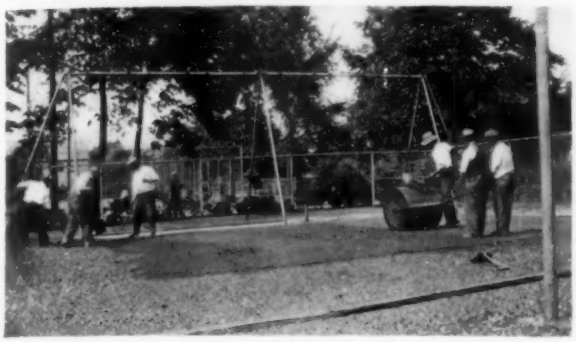
In 1923, Milwaukee's playgrounds were not fenced, nor were they planted with trees, shrubs, or grass. The active play spaces were not surfaced, unless the rough combination of clay and gravel could be called surfacing. In dry weather they were exceedingly dusty; in wet



AN EXPERIMENT IN DESIGN
This playground was built during 1928 and 1929. It is a fairly successful layout, but it has these weaknesses: the sand box is too near to the wading pool, allowing sand to spill into the drains; and the field house has no service yard

BURNHAM PLAYGROUND
The pool here, like those on some of the other grounds, is equipped with showers

CONVERTIBLE COURTS
The night lighted tennis courts at Merrill Park playground are used as hockey rinks in wintertime



ALL-WEATHER SURFACING
This is a view of one of the active play areas at the Cleveland Avenue playground, taken while the surfacing was being put on. A wide variety of active areas is provided here

NORTH PIERCE STREET PLAYGROUND
has now been expanded by the razing of 45 buildings, including those shown above. This is an object lesson in the folly of failing to anticipate playground needs while land is available at reasonable cost

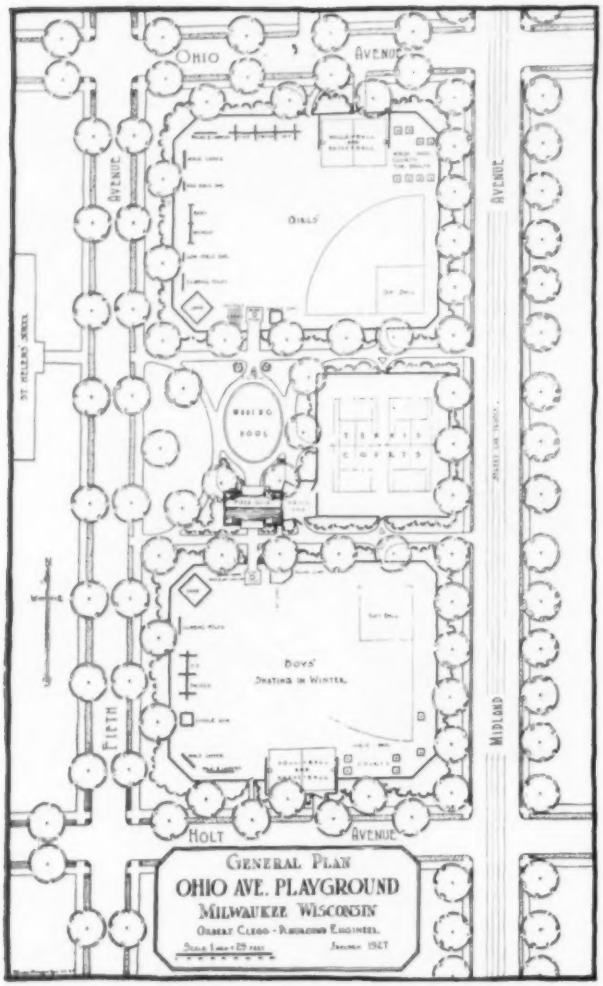
OHIO AVENUE PLAYGROUND
The planting strip outside the fence, here as in other Milwaukee playgrounds, makes the area attractive to neighbors across the street, and to passersby

MERRILL PARK PLAYGROUND
The field house here is typical. It is heated in winter, and contains work-rooms, dressing-rooms, toilets, showers, baby clinics, and a supervisor's room

weather, muddy. A soft-ball diamond, with the outfield sometimes in the street, was often the backbone of the "design." All remaining available space was loaded with basketball goals, climbing outfits, swings, traveling rings, giant strides, ambitiously high slides, flying trapeze, flying rings, parallel bars, and horses. A horseshoe court, often as not, was found on the strip between the sidewalk and the curb. There were no provisions for drainage other than the rough grading of the land. The lighting at night was feeble. There were no field houses, no tennis courts, no regulation baseball diamonds, and no regulation football fields. Tennis courts and baseball and football fields were found only in parks. Supervision took place during the months of July and August only; all-year operation of the playground was unknown. This in 1923.

The Playground of Today

Now, by 1931, these conditions have undergone change. Because of the continual menace of the automobile, all the playgrounds are fenced. Further, the fences are set back 10 to 20 feet from the sidewalks to allow the planting of shrubs, grass, and trees. The active play areas are surfaced with dustless and mudless macadam or asphalt. Soft-ball diamonds are given ample space with a minimum radius of 140 to 150 feet. And the present tendency is not to crowd the playground with apparatus. The tendency is rather to omit the experienced-as-dangerous pieces of apparatus altogether, so that today only the following few pieces are included as standard equipment: climbing poles, flexible ladders, horizontal ladders, horizontal bars, low slides, "junglegyms" and swings. (Consideration is



OHIO AVENUE PLAYGROUND

This playground was built in 1927. It is also a successful playground, but its weak points are that it has only two tennis courts instead of four, and the horseshoe courts are too near to the left field of the soft-ball diamond. Today the horseshoe courts are enclosed with fencing, as shown on the Holt Avenue layout

now being given by some to omit swings in the future because of their dangerousness.) Also, the playgrounds not only are graded and surfaced for rapid drainage in summer, but are so pitched that it is possible to flood them without snow banking for ice skating in winter. Many hard-surfaced tennis courts, regulation baseball diamonds, and regulation football fields have been provided. Substantial brick field houses have been built, and the play areas are well lighted at night with modern floodlights. All this in eight years' time.

With these improvements in playground design and service, have come natural ancillary services and duties. The playground is now operated not only in the summer, but also in the spring, fall, and winter. Hard-surfaced tennis courts, lighted at night, permit playing early in spring and late in fall. Ice skating and hockey areas are exceedingly popular in winter. These activities require supervisory services unnecessary on the playground of eight years ago. In addition, the plantings require nearly continuous care, so that instead of being but a summer proposition, the playground has become an all-year institution.

In 1923, 100 per cent of the average playground's area was devoted to active play, that is, areas occupied by soft-ball diamonds, apparatus, etc. Today, the average playground's area, as typified by the 3.75-acre Holt Avenue playground, is divided as follows:

		Per Cent of Total Area
1.	Active play area (surfaced with macadam)	46
2.	Park area (grass and shrub beds)	28
3.	Tennis court area (4 courts)	21
4.	Wading pool area	3
5.	Field house area	2

The Future Playground

The changes in playground design have therefore been considerable within the past eight years. The rate of change is not lagging at this writing, and it is interesting to contemplate just what changes the next eight years will bring. It is certain that many of the ideas we now have on the subject will be discarded for new ones in the future, so that it is unwise to consider present standards as permanent. This fact makes it difficult to predict the development of the future playground.

The Nation's Recreation Expenditures Increased $5,000,000 During 1930

ALTHOUGH the year 1930 was one of almost unprecedented business depression, 980 cities reported to the National Recreation Association recreation expenditures of $38,518,194.88—an amount exceeding by approximately $5,000,000 the largest amount previously reported expended in a single year. Of this total, to quote from the Year Book issue of *Recreation* (*June*, 1931) *nearly one-third was spent for land, buildings and improvements.* The increase in capital expenditures is felt by the Association to reflect the tendency shown by many cities in 1930 to relieve unemployment among their citizens through the expansion and development of recreation areas and facilities. The bond issues for recreation, totaling $6,573,420.99 in 41 cities, are accepted as another indication of this policy. On the other hand, expenditures for recreation leadership did not decrease, but showed an increase of more than $1,000,000 over the previous year.

The separate play areas reported total 13,354, of which 791 were opened for the first time in 1930. The play areas and special facilities are tabulated as follows:

Outdoor playgrounds	7,677
Recreation buildings	642
Indoor recreation centers	2,066
Athletic fields	1,843
Baseball diamonds	4,322
Bathing beaches	457
Golf courses	312
Stadiums	90
Summer camps	134
Swimming pools	1,042
Tennis courts	8,422
Ice skating areas	1,806
Minniature golf courses	184
Ski jumps	59
Toboggan slides	221

The total number of employed recreation leaders reported is 24,949. Of these, 2,660 are full-time, year-round workers. A total of 8,216 volunteer leaders is reported.

The Year Book contains, as usual, details of the year's developments and expenditures for recreation by cities, with statistics showing facilities, participation, means of upkeep, etc., also directory of managing authorities and officials.

The Sanitary Problem Confronting the Hackensack Valley Sewerage Commission

By THOMAS F. BOWE, Assoc. M. Am. Soc. C.E.
Consulting Engineer, New York City

A LARGE area within the metropolitan zone of New Jersey has been under engineering scrutiny for the past ten or twelve years, and particularly intimate analysis has been given the subjects of housing; manufacturing possibilities; transportation in the form of railway facilities, bridges, tunnels, master highways; water supply; the collection and disposal of garbage and refuse, as well as collection, treatment and disposal of sewage.

Strange as it seems, the policy of sewage treatment has not been thoroughly coordinated with the same degree of foresight as the many other problems, and it is apparent that the full enjoyment of the rivers and harbors throughout the metropolitan zone cannot be realized until such time as the great volume of sewage now discharging into these bodies of water is properly treated. A study of the history of the various watercourses which have been used for the receipt of sewage flow from communities and industrial establishments indicates that these streams must first be defiled and create a positive and actual menace to health and property before much consideration is given to the remedy.

In considering the water-supply problem which confronts the metropolitan section of New Jersey, great stress is being laid on the fact that a shortage will prevail in the next decade in the event that no larger development is available for use. That there is sufficient water of proper quality available to satisfy the potential needs of the domestic and manufacturing requirements is well established, and there remains but the unification of the various constituted authorities to develop the necessary works and allocate the supply on an equitable basis.

Hackensack Valley Sewerage District Created

At this period in the development of Bergen County territory in the Hackensack River valley, the inauguration of a method to collect and treat the spent water supply is a component part of any solution involving a water-supply project. It is obvious, therefore, that the sewage and water problems should be accorded complementary study.

The 1930 session of the Legislature of the state of New Jersey, under Chapter 144, enacted a law providing:

"That all that portion of Bergen and Hudson Counties situated, lying and being between Newark Bay and the boundary line between the state of New York and the state of New Jersey within the natural drainage area of the Hackensack River and its tributaries between the said points, shall be and is hereby constituted a sewerage district under the name and title of Hackensack Valley Sewerage District."

The Board of Chosen Freeholders of the county of Ber-

gen appointed four residents within the district and the governing body of the county of Hudson delegated one resident, and these five members constitute the Board of Commissioners. The personnel is composed of Thomas J. Wasser, M. Am. Soc. C. E., of Jersey City, President; William R. Smith, of Tenafly, Secretary; Horace R. Bogle, of Lyndhurst; Gustave Meyer, of Westwood, and the writer.

Under the law, the Commission is charged to investigate methods and plans for relieving the Hackensack River and its tributaries from pollution and preventing the pollution of them, and to determine the most advisable and advantageous method in respect thereto, and to ascertain the approximate cost of the trunk sewer with such intercepting sewers, pumping stations, disposal system and other appurtenances necessary thereto, or such other plan or method as may appear sufficient for the present and future disposal of the sewage of the district within the Hackensack River drainage area.

The 1931 session of the New Jersey Legislature has provided that the Board of Chosen Freeholders of the county of Bergen be authorized to appoint a water-supply commission to study and develop an independent system for the county at large. A fulfillment of the dictates of the New Jersey Legislature with especial reference to securing ample potable water as well as offering an efficient and economical method for collecting and treating it after its use, will present a logical outline for consideration and action on the part of the inhabitants of the valley.

The Problem

The study of the Hackensack River and its tributaries with particular reference to the collection and disposal of sanitary sewage and manufacturing wastes which affect the purity of the streams offers a unique and interesting problem which becomes somewhat complicated in view of the fact that the drainage area of the Hackensack River involves some 64 square miles of contributing area in the state of New York. Any plan or method dealing with the abatement of the discharge of improperly treated sewage into the Hackensack River must therefore seek a cooperative spirit on behalf of the two states.

The Hackensack River rises near Haverstraw in the county of Rockland, N. Y., and flows southerly emptying into Newark Bay, a distance of some 34 miles in a direct line from the source. The total area from which the river augments its flow approximates 202 square miles, of which 138 square miles lies wholly within the state of New Jersey.

The river is a tidal stream and navigable for water commerce to Court Street in the city of Hackensack. From this point to New Milford, N. J., the head of navigation, there is little depth and practically no commerce. The lower part of the watershed is occupied by tidal meadows, 4 miles wide and 10 miles long, and has an area of some 20,000 acres. This marsh land, generally speaking, is but 2 or 3 inches above the level of high tide.

Tidal Flow for Removing Sewage

The Hackensack Water Co., a privately owned corporation, secures its supply at New Milford and furnishes potable water to many communities in the counties of Bergen and Hudson. Below the dam there are times of the year when practically no fresh water comes to the river from the uplands, and little consideration may be given this element as a beneficial factor in the stream's discharge. The flow, therefore, of the Hackensack River and its major tributaries, Berry's Creek and Overpeck Creek, excluding the rise and fall of the tide, is merely augmented by the precipitation from the area below the intake of the company's filtration plant. It can be readily seen that the tidal flow affords the only diluting medium for the discharged sewage under dry-weather conditions. Considering the tidal flow as being between 320 and 418 million cubic feet per day, there results a dilution of 100 to 1. In normal cases, this would be adequate for preventing a nuisance, were it not for the basic fact that the tidal water has all the characteristics of a fairly weak sewage.

Within the state of New Jersey, there are 56 separate and distinct municipalities contributing domestic waste and manufacturing liquors either directly or indirectly to the Hackensack River. Forty-nine of the municipal subdivisions are within the boundary of the county of Bergen and seven within the confines of Hudson County. Existing conditions display that in many instances the effluent from the treatment works of various municipalities is affected by the prevailing tides. Tests have shown that it requires as many as five or six tidal changes to remove the effluent from its point of discharge and then it merely moves on to the neighboring community for similar behavior.

The present population on the shed within the New Jersey state line approximates 375,000. In the last decade a rate of growth in Bergen County has shown a 73 per cent increase over the 1920 census. The area confined to the tributary shed of the Hackensack River is so situated that the increase in population forecast for the next ten years prompts immediate consideration of a method to economically and efficiently collect and treat the sewage flow from this great territory for the future safeguard of the Hackensack River.

Duplication of Sewage Works

In the past, the installation of sewerage works has been confined to each municipality, and with few exceptions collecting systems and sewage treatment plants have been built and operated independently. The multiplicity of separate and distinct municipalities and their apparent desire to retain individuality has called for an expenditure of funds far in excess of that which would have been required had consolidation of interests prevailed with especial reference to the sanitary problem.

Topographically, there are groups of municipalities which might have developed their interior systems and selected a central point for the erection of a treatment works, thus eliminating duplication of construction costs and operating expenses. Of the fifty-six municipalities involved, thirty-two are provided with sanitary sewerage systems and twenty-seven are equipped with some form of sewage treatment works, many of which are overloaded, others antiquated, and a few modern.

With the many municipalities each having an individual sanitary problem, there is naturally a lack of unanimity of action so far as providing facilities sufficient in size and adequate in treatment for the prevailing flows of the Hackensack River.

During the past three years, a number of communities have modernized their treatment works and are in full accordance with the dictates of the New Jersey State De-

partment of Health. In many instances, the Department has served notices on municipalities to improve and alter their existing plants and the time has arrived when some plan must be forthcoming to satisfy the diversity of opinion which now exists and to coordinate the sanitary problem in an efficient, economical and practical manner.

Upon the assumption that the domestic sewage and manufacturing wastes are eliminated by means of sewage treatment works for the Hackensack valley, there remains the problem of the quality of water in the Hackensack River which is subject to the sanitary conditions of tidal waters of New York Bay, Kill Van Kull and Newark Bay. A reflection on the immediate projects of great magnitude with reference to the abatement of nuisances created by sewage discharged into rivers, bays and harbors in the metropolitan zone, bespeaks the activity that is being waged by New York and New Jersey. The complete cooperation of these states is essential in order to realize the ultimate solution for purification and protection of the bodies of water common to both great states.

Philadelphia Inspects Its Oldest Cast Iron Water Main

Novel Celebration Staged When Administration Announces Development of a Larger Water System for Growing Section of City

LAST April a section of the oldest cast iron water pipe in the United States was excavated for the inspection of municipal officials in Philadelphia. This pipe was laid over a century ago and has served the city ever since without interruption. The excavation was made the occasion for a radio program which was broadcast from a stand erected at the side of the excavation in the heart of the city. Addresses were made by the Mayor, the Director of Public Works, and the Chief of the Bureau of Water Supply. A crowd of approximately 5,000 Philadelphians gathered to witness the proceedings and listen to the speeches, which, in addition to going out over the air, were projected through amplifiers and a public address system installed for the occasion.

An examination of the pipe showed it to be in excellent condition and still capable of functioning for an indefinite period. This pipe is a part of the system started in 1817. Prior to that time all water mains in Philadelphia and, in fact, in the country, were of wood. The water committee had decided just after the year 1800 to make a study of better water-carrying facilities and, as a result, decided to import from England a small quantity of cast iron pipe to be laid as an experiment. The results were so satisfactory that from time to time iron pipes were laid to take the place of wood. The pipe excavated is a piece

ORIGINAL CAST IRON PIPE IN PHILADELPHIA'S WATER DISTRIBUTION SYSTEM

1. A section of cast iron pipe laid in 1827, excavated for inspection May 1, 1931. 2. The section of 104-year-old pipe removed and under inspection by Director of Public Works Murdoch and Mayor Mackey

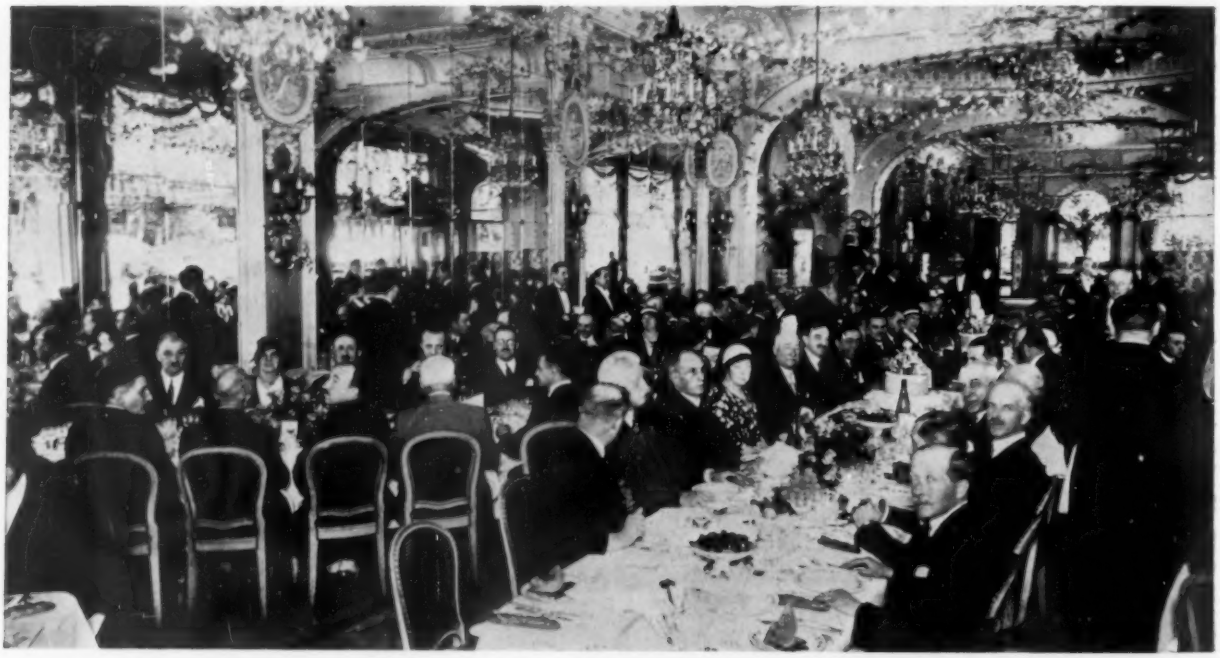
of the early pipe ordered from England. It is of the bell-and-spigot type and is in 9-foot lengths. A curious feature of these pipes, as mentioned in a paper before the American Society of Civil Engineers in 1914 by Marshall R. Pugh, is that each length had three or four rings about it approximately 1½ inches wide which were presumably to afford places with heavier walls in which to tap the pipe. Although these original pipes are now only an infinitesimal part of Philadelphia's present great system, they still constitute a considerable mileage.

The officials who superintended the uncovering the pipe took the occasion to announce to the citizens of Philadelphia the plans of the administration for developing a larger and more complete water system for a section of the city which had formerly been devoted to private homes, but which is now becoming the location for hundreds of large apartment houses. This section lies between Broad Street and the Schuylkill River and south of Market Street.

When Philadelphia's City Fathers in 1817 approved the pipe that was excavated on this occasion, they had just completed a sixteen-year study of all kinds of water-conveying devices. The records of these studies are still available and make an interesting exhibit. Cast iron had not been used in this country for water pipe up to that time. In Europe, however, there had been some noteworthy installations, the earliest being that of the Gardens of Versailles, where in 1664 by order of Louis XIV cast iron pipes were laid from the reservoirs of Picardie to those of Montbaron, together with a spring-water conduit to supply the town, as well as the fountains. These cast iron pipes, now 267 years old, are still in service.

Prior to the use of cast iron pipe and, even during the early days of its adoption, pipe made of wood and some made of lead were used. In the city of London, much wood pipe was used, but old reports from London state that wood pipe had to be completely renewed every twenty years. The first log pipe laid in Philadelphia was in 1799. It had an outside diameter of 18 inches and a bore of 6 inches. Specimens of this pipe are now on exhibition at the Franklin Institute in Philadelphia.

American Mayors in the Bois de Boulogne



AN example of the charming and cordial French hospitality extended repeatedly in a tour whose significance has been greatly distorted by sensational newspaper stories, is shown in the accompanying picture. The photograph was taken at a luncheon in one of the famous restaurants in the Bois de Boulogne, on June 11. Interspersed with their French hosts throughout the large room were the American municipal executives and their wives who visited Franch last month as the guests of that country.

The Editor of THE AMERICAN CITY had the privilege of joining the party for this one day in Paris and vicinity, on his way home from the International Housing and Town Planning Congresses in Berlin. He can testify to the bounteousness of the hospitality extended and to the sincere appreciation by the American visitors of this opportunity to travel through urban and rural France under official auspices.

It is unfortunate that what ought to have been the means of cementing more strongly Franco-American friendliness has had even temporarily, owing to newspaper exaggerations of certain trivial incidents, perhaps the opposite effect. But the coming months will afford many occasions for achieving the intended results. These opportunities will come through the many invitations to address local organizations in their respective cities on their observations in France already being received by the mayors and their representatives who participated in the tour. In responding to such invitations much will be said, we are sure, not only of the charm of France and the hospitality of its people, but of a determination growing out of the recent visit to strengthen by word and deed the traditional friendship of the great French and American republics in the interest of a mutually helpful and warless world.

Practical Control of the Street-Paving Dollar in Indianapolis

By MYRON G. JOHNSON
Assistant City Engineer, Indianapolis, Ind.

VERY few cities have attempted to scientifically control paving material in any way. Its application in its fullest extent to street and alley construction presents problems unlike those encountered in county and highway construction. Its application in cities in some cases demands a drastic change in the paving industry, as well as change in the relation of the engineer to the contractor. Indianapolis specifies a minimum strength of concrete, requiring 2,000 pounds per square inch compressive strength for foundations for pavements, and 3,500 pounds per square inch compressive strength for standard concrete pavements, before acceptance, and by this method the city is attempting to scientifically control the paving materials in a practical way. This specification has been in force for the last three years. In determining a definite quality of concrete, a certain value naturally is placed thereon, which in my estimation is eliminating the enormous waste which preceded the adoption of this specification. Statistics proved that the greater part of the loss or waste in not procuring fair value for this product was due to the ignorance of all parties in not combining materials properly to secure the highest-quality finished product.

The facts presented at this time regarding the control of paving materials as applied in Indianapolis are given in relation to high compressive strength concrete only. Four or five thousand cylinders have been tested and the results obtained used in presenting this report. The materials are controlled on our paving projects in a practical manner, requiring little additional equipment other than what is used on most paving projects in the country. The results were secured by assisting the contractor educationally in procuring high-strength concrete. Much of the credit for the results obtained during the last three years must be given to our City Civil Engineer and the Municipal Testing Laboratory. The laboratory engineers are well trained in the proper control of materials in concrete, and have always aided the contractor in eliminating defects and poor workmanship which resulted in defective concrete. All materials are tested and all cylinders molded as recommended by the American Society for Testing Materials. Cylinders were cured in the laboratory 28 days before testing until last year, when completed contracts were accepted if the 14-day tests were above the minimum required.

Securing Better Concrete

During 1925, 1926 and 1927 molded concrete cylinders were completed as the work progressed on all projects, and were later tested for compressive strength. The defective cylinders were analyzed and the engineers immediately investigated the conditions on these particular projects and ordered necessary changes to eliminate the failures if possible. A continual check was made on these concretes until the quality of the concrete was satisfactory. No specified strength was required during these three years, and the testing reports served merely as a source of information to the engineer as to the quality of the concrete being produced. During this period, numerous changes were made in the specifications, and the contractor was educated in the importance of water control, proper proportioning and proper grading of materials. The old shoot type mixer became obsolete, accurate measuring devices were insisted upon, such as strike-off batchers, and timers were required on all types of mixers. The results obtained from tests completed during 1925, 1926 and 1927, when the strength was not specified, were as follows:

Average compressive strength of all cylinders tested for concrete foundations was 25 per cent over the minimum which is required today; 32 per cent of the cylinders were below the minimum; the average compressive strength of all cylinders tested for standard concrete pavements, including alleys, was 10 per cent under the minimum now required; and 61 per cent below minimum.

Minimum Strength Specified in 1928

In 1928, specifications were adopted requiring minimum compressive strength concrete on all paving projects before acceptance. The results show an enormous increase in the quality of concrete placed in the streets of Indianapolis during the last three years. The average compressive strength of all concrete tested for foundations is now 40 per cent above that required. The percentage of cylinders which tested below the minimum now required is 5.5 per cent. The average compressive strength of test cylinders representing standard concrete pavements, including alleys, is now 20 per cent above minimum now required, and the percentage of cylinders tested which were below minimum required, is now but 8 per cent.

It seems hardly possible that such an increase in the quality of concrete could take place without any increase in cost to the contractor. Although the laboratory engineering force and equipment were increased, it is not difficult to estimate the enormous dividends the city laboratory has paid the taxpayers during the last three years. Upon analyzing the yearly reports, it is remarkable to note that the compressive strength of concrete being placed today with 1.18 barrels of cement per cubic yard of concrete is as high as the concrete produced in 1927, which specified a mix of approximately 1.5 barrels to the yard. This remarkable increase and progress is due to the elimination or modification of the following practices, which were in the past very prevalent, and which were the most serious: the use of fine or quick sand in the mix in place of concrete sand; the sloppy mix; dirty or unsatisfactory grading of coarse aggregate; no allowance for bulking of sand; failure to adjust the mix for workability.

Before specified-strength concrete was required on con-

tracts, the Engineering Department held the sole responsibility for the acceptance or condemnation of materials used. If it was impossible for the Department to approve or condemn materials, they nevertheless entered into the concrete, and its quality remained an unknown quantity indefinitely. At the present time the approval or rejection of materials has become the problem of the materialman and the contractor, who now insist that proper materials be delivered to the project. The contractor has become more interested in the entire construction of the slab and in so doing has raised the standards of his organization, as well as of the materialman, which is naturally beneficial to both. Pavements are not accepted until the test reports are submitted to the engineer. Sections of pavement showing deficiency in compressive strength are considered unsatisfactory, and a reduction in price per square yard of this section is made in proportion to the deficiency. In other words, the contractor is paid for the quality of his product, for value received, regardless of cost.

The molded cylinders are taken at frequent intervals, as often as six or eight times daily, depending upon the speed of the contractor, the size of the project and the efficiency of his organization. When the test reports covering molded cylinders indicate serious defects, the core drill is used to secure additional cylinders, which are tested and a complete check made of the pavement before acceptance. The Testing Laboratory also keeps the Engineering Department well informed as to the quality of product being produced. The Engineering Department analyzes the quality of the contractor's product, when cylinders are questionable, that he may adjust his mix and eliminate his trouble at once, before a serious deduction could be possible.

Central Mixing Plants

Indianapolis today is about to adopt an alternate specification to scientifically control the paving material at central mixing plants, requiring only a specified strength of concrete. Other cities are gradually adopting the practice of scientific control of paving materials through central mixing plants and are distributing the scientifically prepared product to the individual project, either by transit mix or agitating truck bodies. At present, the method and cost of transit seems to be the controlling factor as to its practicability. There is no question but what a higher quality product can be produced at less cost at a scientifically controlled plant than on the project.

This change in the paving industry makes the contractor a producer or manufacturer of a marketable product, and I most certainly would recommend that the price of this product should depend entirely upon its quality as delivered, providing at all times it is of workable character to complete a satisfactory pavement. His ability as a manufacturer in producing this product, surely would also determine his cement content, as well as the material content, depending also upon the quality of the materials entering into the mix. Only the quality or strength need be regarded as a constant.

Pay for Value Received and Penalize the Poor Product

At the present time, no consideration whatsoever is given the contractor whose concrete is of a better product than his competitor's. It would seem that the irresponsible contractor could soon be eliminated and the efficient, reliable contractor would be rated as to the quality of his product and receive all benefits which he should rightfully obtain. Since the value of this product today is not a deciding factor, the responsible, efficient manufacturer or contractor can do nothing but pray that his honesty, ability and financial standing may influence the officials to award him the contract, even though he is a higher bidder.

The average contractor with a standard paver is producing today approximately a cubic yard of concrete every one or two minutes while in operation. No one can legitimately dispute the fact that it is gross negligence to manufacture a product at a cost of from $300 to $500 per hour and place as supervisor over its production, someone who merely has been told that cement, sand and gravel of a certain mix produce good concrete. It certainly is practical and efficient to secure information to determine in some manner a fair value for such an expensive product before it is ready for service. If a specified mix should without question give a product having a certain strength or load capacity and there is no proof available that it will carry even half its proper load, it is most natural to assume that it is a financial loss.

Every paving engineer and contractor who is truly interested in this great industry should demand scientific control of street paving materials in some manner or other to insure value received and raise the standards of the engineering profession, as well as the paving industry. If a commercial manufacturer under average conditions was to market a product of as great a value as concrete and give as little attention to its quality or value as in some paving projects, his industry would soon pass out of existence.

ACKNOWLEDGMENT.—From a paper presented at the Seventeenth Annual Road School, Purdue University.

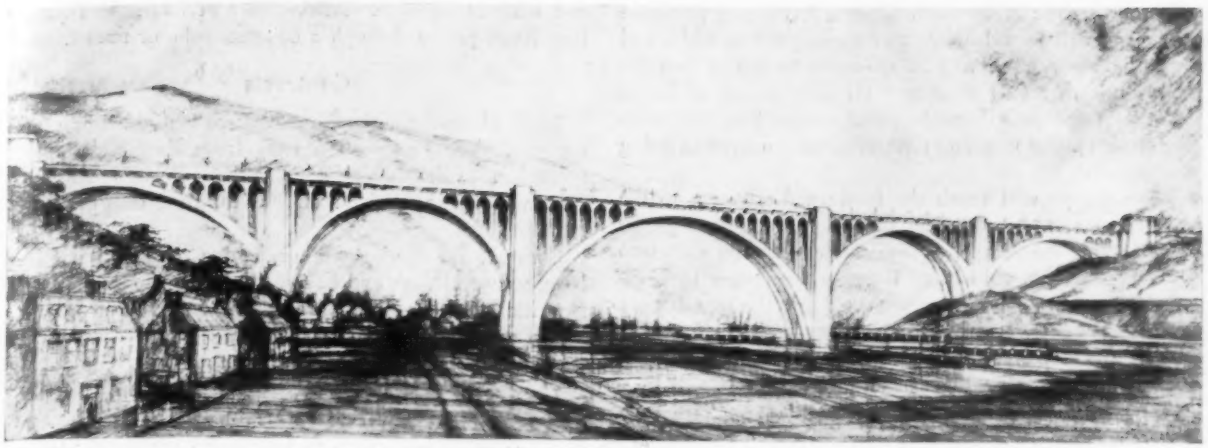
A DEGREE FOR A PLANNER

AMONG the honorary degrees granted by Columbia University on June 2 was one that recognized a "singularly high type of public service." It was that of Jay Downer, who has employed his engineering skill in beautifying a whole county through the artistic planning and development of its highways, parks, and other unbuilt areas.

"About all that the people hold for themselves of the great public domain, aside from the sites of the public buildings and forest reserves," says the *New York Times* in an editorial on the subject, "is that residue which is devoted to streets, highways, parks and playgrounds. These areas in Westchester County have been the special concern of Mr. Downer as Chief Engineer of the County Park Commission. It is demonstrable that he has been one of Westchester County's best assets, adding millions to property values."

The conferring of an honorary degree of Doctor of Science upon him as a "planner" is encouraging recognition for this new type of engineer who is thinking for the people about their future environment, as well as about their present convenience. This prophet is not without honor even in his own county.

Since 1922, the Commission's expenditures have totaled $63,307,321: on Rye Beach; on its four waterfront parks; on its three golf courses; on its magnificent parkways. These developments have already had great importance in recreation planning the country over. Wherever they are familiar, so is the name of the designing engineer.



PERSPECTIVE OF THE GEORGE WESTINGHOUSE MEMORIAL BRIDGE

A New Concrete Arch Bridge

The George Westinghouse Bridge at Pittsburgh, Pa., Will Have a 425-Foot Center Arch

EVERY resident of western Pennsylvania, those thousands who live and work in the Turtle Creek Valley, every motorist of the United States who has driven or may ever drive over the Lincoln Highway, will be interested in the improvements now under construction on that highway between Wilkinsburg and East McKeesport, a distance of 5 1/3 miles. The driving time will be reduced by 20 minutes over the new section, and one of the worst bottle-necks between Pittsburgh and Philadelphia will be removed with its completion.

One of the most spectacular features of this $4,000,000 improvement is the construction of the George Westinghouse Bridge, a giant structure spanning the busy industrial valley from one hilltop to the other, a distance of 1,510 feet, and 200 feet above the railroads and properties down below.

For years state and county engineers had been studying the problem of relieving the congestion of traffic through East Pittsburgh and Turtle Creek. Experts in highway design are agreed that the modern highway must have speed, safety and capacity. These elements were impossible on the existing route, although the designation of certain streets as one-way thoroughfares relieved conditions in both East Pittsburgh and Turtle Creek to a great extent.

To build speed, safety and capacity into a highway, it must have easy curves, flat grades and sufficient width. Intersections must be eliminated, local traffic must be avoided, parking must be kept at a minimum, and footbridges or underpasses must be provided for the pedestrian crossings. That the new work will satisfy the demands for speed, safety and capacity is indicated by the fact that the steepest grade will be 4.5 per cent, that is, 4½ feet in 100 feet of distance. Also, curves are all on long radii; for thre emiles the highway has no intersections; there will be no street cars; and local traffic will be separated from through traffic to their mutual advantage. Speed and safety will thus be achieved.

The roadway of the bridge will be 42 feet wide, sufficient for four lanes of traffic. In designing highways, engineers figure that 2,000 cars an hour can pass a given point in one lane traveling 20 miles an hour. This is the speed at which experts claim the greatest number of automobiles can be moved.

On this basis, the George Westinghouse Bridge will have a theoretical capacity of 8,000 cars an hour. Other sections will have a 60-foot width, maintaining four clear lanes and the same estimated capacity even when cars are parked on both sides of the pavement. Future growth of traffic has been anticipated by the purchase of such a right-of-way as will permit the addition of two more lanes when that becomes necessary.

Construction Details

According to Norman Brown, Director of the Allegheny County Department of Public Works, the George Westinghouse Bridge will be the largest structure of its kind in the United States. It will be composed of five reinforced concrete, open spandrel ribbed arches; the center arch, 425 feet long, with 20 panels, being the longest reinforced concrete arch in the country.

From face to face of abutments, the bridge will be 1,510 feet long. The roadway will be on a 4 per cent grade, rising to the east. The center arch will clear the Pennsylvania Railroad tracks by exactly 200 feet. An 18-story building could be placed under the bridge at this point.

There will be 73,350 cubic yards of reinforced concrete in the bridge. Giving each man a load of 75 pounds, it would require our entire World War army of 4,000,000 men to carry this 150,000-ton burden. Incidental to the bridge construction, 39,000 cubic yards of excavation are required, and the reinforcing steel alone will weigh 3,700,000 pounds. Two 7-foot sidewalks will parallel the paved roadway.

Connecting the bridge with Electric Avenue or Ardmore Boulevard will be a hillside pavement, 60 feet wide, and the actual connection will be made by means of two 30-foot ramps that will eliminate all intersection of traffic lanes, as local and through travel merge into one common stream going west and separate into two streams going east.

These ramps will reach the boulevard adjacent to the street-car tracks between the two roadways, local traffic being outside the ramps. From this connection west into Wilkinsburg, at a point near Rebecca Avenue, a right-of-way 100 feet wide has been obtained for the two 30-foot pavements, the 27-foot traction lane and 13 feet for sidewalks. The old or eastbound pavement is 24 feet wide, but will be made 30 feet wide at a later date.

Culverts

To make this boulevard and ramp construction possible, the stream known as Fall Run is being enclosed for about 3,000 feet of its length in a reinforced concrete box culvert, 10 feet wide, 6 feet high, and costing approximately $200,000. At certain points this culvert will support a heavy fill as well as the traffic of the highway.

Just east of the Westinghouse Bridge and parallel to the larger Turtle Creek Valley, lies Dickson Run. To span this ravine and Dickson Run Road with the new pavement at the high level, a concrete culvert 350 feet long was constructed to take care of the stream. This was buried 125 feet deep under an earth fill 900 feet long and 450 feet wide at its base. Also, under this fill, the Dickson Run Road passes through a concrete tube or tunnel.

Contracts

Work along the entire improvement is divided into four sections. The east section runs from East McKeesport, 6,963 feet, to the George Westinghouse Bridge. This contract was let to Michael H. Parish, Inc., of Pittsburgh, for $827,686.

Contract for the second, or bridge section, 1,510 feet long, went to Booth and Flinn, Pittsburgh, for $1,483,000. Not included in this contract will be items of paving, lights, pylons, rails, etc., which will run an additional $267,000.

The third section, 8,555 feet long, includes the hillside road, ramps and Fall Run culvert, and the contract went to the Herkner Company, of Cleveland, Ohio, for $1,137,780.

The fourth, or west section, calls for the boulevard construction for 11,148 lineal feet on Ardmore Boulevard, and the contract went to the McCrady Construction Co., of Braddock, for $298,062.

Allegheny County is building the bridge, and the state of Pennsylvania is building the other three sections. State and county will make an adjustment after completion of all work, so that the total cost, approximately $4,013,528, will be divided evenly.

All pavement is to be a brick wearing surface on a reinforced concrete base.

Municipal Airports Making Improvements to Obtain High Ratings

EXTENSIVE improvements to airports, particularly municipal fields, have been going on in the last few months. Reports received by the Aeronautical Chamber of Commerce of America, Inc., from nearly 100 cities show an expenditure of over $2,200,000 in airport construction work this spring.

Among the improvements undertaken at the Oklahoma City municipal airport were hangars, runways, a drainage system, and a radio station. The total for improvements made at this field is stated to be over half a million dollars. At the Chicago municipal airport the cost of runways is placed at $170,000, buildings $76,556, grading and drainage $160,000, and fencing $20,000, a total of $426,556.

Similar amounts have been or are being expended at other large municipal fields—$200,000 at Boston, Mass., $175,000 at Fort Worth, Texas, $88,700 at Denver, Colo., and $79,500 at Mobile, Ala.

Among the cities spending smaller sums on their airports are Monticello, Ark.; Ft. Wayne and Terre Haute, Ind.; Fresno, Oakland, San Francisco, Santa Monica, Selma, Bakersfield, Los Angeles, San Diego and Marysville, Calif.; Washington, Kans.; New Orleans and Lafayette, La., Detroit, Mich.; Helena, Mont.; Baltimore, Md.; Westfield, Mass.; Newport, N. H.; Rochester and Utica, N. Y.; Columbus, Ohio; Muskogee and Tulsa, Okla., Roseburg, Ore.; Johnstown, Pa.; Midland, Texas; Seattle, Tacoma and Centralia, Wash.; Morgantown, W. Va.; LaCrosse and Princeton, Wis.; Sheridan and Cheyenne, Wyo.

Many airports nearing completion of construction programs which should enable them to qualify for Department of Commerce ratings, are on the schedule of an airport specialist of the Department's Aeronautics Branch, who left Washington early in June for a tour including Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Iowa, Missouri, Illinois, Indiana and Ohio.

Conferences are held between the Department's representative and those municipalities and civic organizations desiring assistance in the selection of sites and information regarding requirements for the development of suitable airports, according to Harry H. Blee, Director of Aeronautic Development, who states also that there is considerable interest in airport rating due to the fact that many existing airports are improving their facilities to an extent that will make them eligible for Department of Commerce ratings.

"In many cases," he says, "cities and corporations operating airports have preferred to wait until they could qualify in the highest classification before applying for ratings. To this end, they have been improving their facilities so as to render better service to their customers, and at the same time to meet the requirements for A-1-A ratings. Landing areas have been provided with proper drainage, new turf has been prepared for all-over landing areas, hard-surfaced runways have been installed, hangars and other buildings have been erected, and improvements have been made in aeronautic lighting, including floodlighting for night landing, airport beacon lights, boundary markers and obstruction lights.

"In the twelve states to be covered in the itinerary of the airport specialist, the airport investment at the first of the year was approximately $32,000,000, according to a survey made by the Aeronautics Branch. The airports in this region were planning, on the first of January, the expenditure of nearly $6,000,000 additional for improvement of existing airports.

"Cities desiring to avail themselves of this service, rendered without charge as part of the general program of fostering progress in aeronautics, should address the Aeronautics Branch, Department of Commerce, Washington, D. C."

Is City Planning Effectively Controlling City Growth in the United States?

Excerpts from the Presidential Address of Harland Bartholomew, President National Conference on City Planning, at Rochester, N. Y., June 23, 1931

WE have over 900 cities, towns, and villages with zoning ordinances, and approximately 700 city plan commissions. To what extent do these figures signify an effective control of city growth which is economically and socially sound and esthetically desirable?

There are five essentials to the successful practice of sound city planning which can be set down briefly as follows:

1. Good plans
2. Proper legislation
3. Competent administration
4. Public understanding
5. Financial surveys and work programs

No American city yet possesses these five essentials to the full degree required for the well-organized control of city growth. Few cities even approach the desired degree of coordination of these essentials without which "completeness" can never be achieved.

Good Technical Plans

While it is difficult to pass a general opinion upon the technical quality of current city planning work, it is possible to comment somewhat specifically upon certain aspects thereof. Probably the greatest deficiency is lack of genuine comprehensiveness. Too often there is over-emphasis of zoning or of street planning, for instance, with correspondingly less attention given to other elements of the city plan.

Too much of our city planning is based upon a universal insistence that there be no limit placed upon city growth. Good technical plans are impossible to prepare if there be no limit of growth—no definite "scale" of things, as the early President of the National Conference on City Planning, Frederick Law Olmsted, repeatedly emphasized. Neither can our city planning be done upon a day-to-day or year-to-year basis, for that is what has led to as many of our present difficulties as the opposite extreme of assuming that growth is unlimited.

Our zoning has over-emphasized the protection of certain better type residential districts and either ignores or seldom effectively controls the distribution of population in accordance with reasonable standards. In apartment house areas we permit ten times the density of population of one- and two-family districts, or even ignore the density regulation entirely; and this despite the fact that population density regulation is the only scientific basis for planning sewers, water, schools, and various sorts of public utility services.

Most of our zoning plans are all out of scale, having erred usually on the side of providing for unlimited growth of apartment houses and of business often far beyond any reasonable or possible degree of growth. In this, of course, we see the subordination of effective city planning to the desires of real estate speculation. There is ample room for legitimate real estate investment under a properly drawn city plan, but there can be no sound city planning which is based upon the unlimited and usually whimsical desires of real estate speculation.

Probably the greatest deficiency of current city plans is lack of attention to the preservation of values or the rehabilitation or replanning of those vast areas of old residential property that are found in every city between the downtown business districts and the suburbs. Too much of our planning has dealt with the two extremities and ignored these intermediate areas.

We could and should plan to rebuild these blighted districts with all those things that are the presumed advantages of the decentralized city, i.e., good houses, less congestion, more open space and attractiveness, and, through use of the neighborhood unit, promote personal interest in the community in place of the individual indifference of today.

Proper Legislative Sanctions

The next few years will probably witness as widespread adoption of comprehensive planning laws as has been the case with zoning legislation in the past ten years. Until such planning laws are widely adopted and used, most of our city plans will remain more or less paper schemes used occasionally, perhaps, but ineffectual in really controlling the great percentage of city growth.

Legislation for expeditious and equitable property condemnation and for cost distribution in the form of special benefits is sadly lacking in most cities and states. Minneapolis has used its Elwell Law with splendid results. Kansas City, Fort Worth, and Memphis have done very well, but there are few other cities where such legislation has produced thoroughly satisfactory results. Legislation of this character is one of the outstanding needs of most of our cities.

Capable and Unbiased Administration

It appears that city planning is most effective in American cities of moderate size, where growth has not been so great as to substitute speculation and greed for reason. It is in this group of cities that we find the most efficient government, the better municipal administrative service and the most effective planning. The cities are still sufficiently small to make personal acquaintance of individuals a factor to be reckoned with, and where special-interest groups consequently have to plead their causes upon merit and not merely upon their ability to "get away with it."

There are now found in American cities numerous officials, intelligent, capable and willing to administer city plans, who would see that our cities grow in an orderly, efficient and attractive manner if given the opportunity. Of course, a small percentage of incompetents of one kind or another would always be found, but we are by no means lacking in an ever increasing supply of well-trained and experienced men and women for municipal service. The problem is how to give them opportunity to administer plans in a free and unbiased manner. Under the city manager form of government this is usually most possible, and even here the results vary according to the charter form, the composition of the council and the capacity of the manager.

Well-organized Public Support

Some check or safeguard must be interposed between a comprehensive plan once adopted and the whimsical vagaries of special group interests that generate enough noise and smoke to pass for solid public opinion.

This cannot be done by law. It goes deeper than the law, for the very best laws can always be changed, and usually will be in the face of a good high-powered group interest. Our cities need to be organized for sound community planning in order that the demands of special interests can be judged upon their merits.

Since our municipal life is now so completely organized into special group interests in the form of committees, clubs, leagues and chambers for this and that, why not form another equally well organized, financed and administered for the special purpose of promoting good civic environment as distinguished from political affairs? Let us call it for present purposes a Chamber of Civic Affairs, so that it may embrace all of those things included in comprehensive city planning or analogous thereto. If well organized, and if there be sustained effort, the work could perhaps as well be done by a Chamber of Commerce as to add another organization to our already over-organized cities. Such support would attract more responsible citizens to public life.

Financial Surveys and Work Programs

City planning attains its greatest value only when coordinated with a municipality's financial policies and program. Without comprehensive city plans, no well-balanced program of capital expenditures is possible, for there is no way of determining the ultimate amounts needed or of determining the relative merits of various projects. Special-interest groups too often sponsor this and that until a municipality finds itself burdened with debt and only a few of its public needs actually well provided for.

There can be no fixed formulae or scale of capital expenditures, but, obviously, if American cities are to curtail their rapidly increasing tax rates, bring about a more balanced form of public expenditure and secure more genuine advantages in community living conditions for their tax dollar, there must be more comprehensive city plans which are thoroughly studied, officially adopted, publicly supported and coordinated with capital expenditure programs.

Conclusion

There are 20,828,542 people living in the 13 cities having over 500,000 population. There are 7,956,228 people living in 24 cities having 250,000 to 500,000 population; and 7,540,966 people in 56 cities of from 100,000 to 250,000 population; 6,491,448 people living in 98 cities of from 50,000 to 100,000 population; and 6,425,693 people living in 185 cities of from 25,000 to 50,000 population.

While any generalization is but a hazardous guess, it is doubtful whether city planning is much more than 5 per cent effective in the largest cities nor more than 25 per cent effective, on the whole, in the smaller cities. While city planning under present practices is more or less hopeless in the largest cities, it can be made 75 per cent to 90 per cent effective in the smaller cities, to their economic benefit as well as to their social and esthetic advantage.

In the smaller cities lies the hope of America. Life can be made more pleasant and enjoyable and more economical. But before we achieve such satisfactory and complete cities as we may desire, we must realize that effective city planning is an integration of the five essentials previously described, i.e., good plans, proper legislation, capable administration, and thorough public understanding based upon sound financial programs.

City Planning and Housing Conferences to Meet in Los Angeles and Boston Next Year

AS a result of the decision of the International Federation for Housing and Town Planning to hold its next congress in Boston in the early fall of 1932, and of invitations from both Los Angeles and Boston extended at the Rochester meeting of the National Conference on City Planning last month, both the east and west coasts are likely to entertain important planning conferences next year. If dates and other details can be satisfactorily adjusted, it seems probable that in Los Angeles the National Conference on City Planning will hold a two- or three-day session in May or June; and that in Boston in late September or early October the National Conference will hold its regular annual meeting, during the same week as the International Federation for Housing and Town Planning and the National Housing Association.

It is expected that leaders in the city planning movement throughout the United States will attend both the Los Angeles and Boston sessions; but one important advantage of two meetings in 1932—one in the West and one in the East—will be the ability of hundreds of planning and zoning officials and consultants to attend a national conference at a cost of time and money much less than would be involved if a transcontinental tour were necessary.

The Rochester Conference

The twenty-third National Conference on City Planning, held in Rochester June 22 to 24, was attended by 270 delegates, representing 28 states, the District of Columbia and Canada. The subjects discussed in an exceedingly valuable series of papers, which will be available in the printed proceedings, included:

Mass Transportation on the City Street
Transportation and Traffic—Echoes from the International Planning Meeting in Berlin
The Relation of City Planning to Special Assessments
County Planning
Problems of Zoning and Zoning Administration
Planning in Rochester and Monroe County
A Planning Program for Smaller Cities
Is City Planning Effectively Controlling City Growth in the United States?
Architectural Guidance in Relation to City Development
Master Plans and Official Maps—The Basis of Effective Planning
The Avoidance of Blight in Areas Adjacent to Traffic Thoroughfares

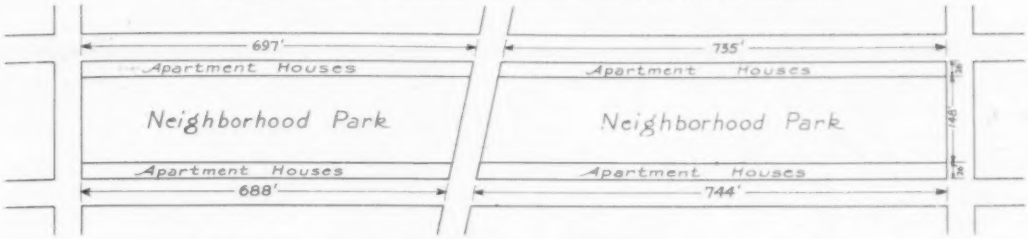
Harland Bartholomew, of St. Louis, was re-elected President of the Conference, as were also Alfred Bettman, of Cincinnati, Vice-President, and Flavel Shurtleff, of New York, Secretary. The seven directors elected for the three-year term expiring in 1934, were Carey H. Brown, Rochester, N. Y.; John C. Carroll, Seattle, Wash.; Frederick H. Fay, Boston, Mass.; George McAneny, New York; John Nolen, Cambridge, Mass.; L. Deming Tilton, Santa Barbara, Calif.; Robert Whitten, New York. The terms of fourteen other directors, elected at previous conferences, expire in 1932 or 1933.

The Berlin Congresses

At the Berlin sessions, held June 1 to 5, John Nolen, of Cambridge, Mass., was elected President of the International Federation for Housing and Town Planning; Kai Hendriksen, of Copenhagen, Chairman Executive Committee; Robert Schmidt, of Essen, Honorary Treasurer; C. B. Purdom, of London, Assistant Honorary Treasurer; George L. Pepler, of London, Honorary Secretary; and H. Chapman, Organizing Secretary. The sessions were attended by several hundred delegates representing most of the countries of Europe, and by a few from America and other parts of the world; as were also the sessions of the International Housing Congress (with headquarters in Frankfort-on-the-Main) held separately but simultaneously during the same week in Berlin. The latter organization will hold no congress next year, but its members will be invited as individuals to attend the Boston meeting, above mentioned, of the International Federation for Housing and Town Planning.

Ought Cities to Buy Block-Interiors for Public Playgrounds?

A High Court Decision and an Editorial Comment



$1,200,000 IS TO BE PAID BY THE CITY OF NEWARK, N. J., FOR THIS STRIP OF OPEN SPACE

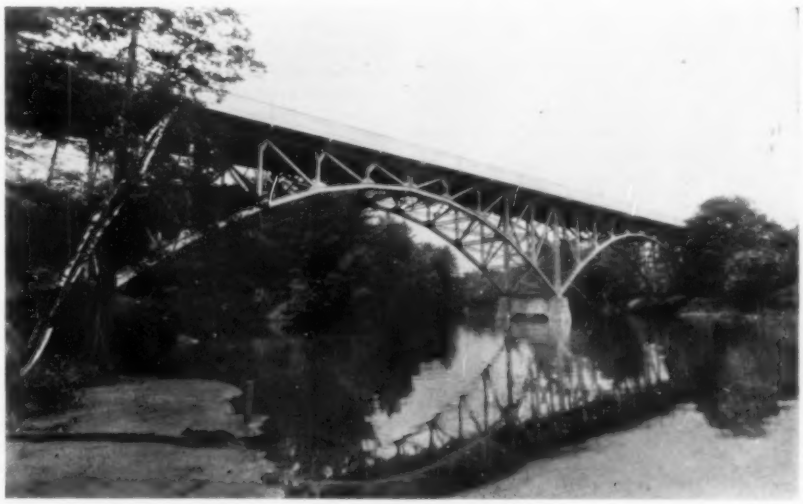
AN important problem of public policy, affecting both housing and recreation, is raised by a decision of the New Jersey Supreme Court handed down on June 18.

Under an act of the 1929 Legislature, insurance companies in New Jersey were authorized, under certain restrictions, to finance housing projects for wage-earners. Acting under this law, the Prudential Insurance Company acquired last year three sites for large-scale housing projects in widely separated sections of the city. On one of them, six buildings of excellent design are under construction, occupying a little less than 40 per cent of the ground area. In the second site which the Prudential desired to improve, it was found that the cost of the two blocks of land—about $1,800,000—was so high that it would be impossible, without aid from the city, to erect modern apartment houses to rent at prices which the colored population of the district could afford to pay. To solve this difficulty, a proposal was made by the insurance company that the city purchase for $1,200,000 an interior park strip 140 feet wide running the entire length, 1,432 feet, of the two blocks. The remaining strip of 30 feet on each side of the park was to be occupied by five-story fireproof apartment houses, these to be about 26 feet in depth, with a 4-foot walk on the park side.

This unique proposal received a favorable vote of 4 to 1 of the City Commission, but was promptly attacked in a taxpayer's suit as being an unjustifiable use of public funds in aid of a private housing enterprise. It was also alleged that the price to be paid was excessive, and that the interior strip to be acquired was wholly unsuitable for use as a public park. In the decision now rendered, as reported in the *Newark Evening News*, the ordinance and contract are upheld, the Court declaring that they do not "bear upon their face any intrinsic evidence of a purpose to expend public money in aid of a private enterprise. On the contrary, both recite the purpose of the city to procure an improvement in the housing situation in the particular neighborhood and in connection with that improvement to provide for the benefit of the public at large."

THE AMERICAN CITY has a high regard for the public-spirited officials of the Prudential Insurance Company who have shown their earnest desire to help the city of Newark towards a solution of its housing and slum clearance problems. Modern apartments for several hundred families, and a park and play area 140 feet wide and more than a quarter-mile long, will unquestionably benefit temporarily the congested negro section under discussion. But, with a long-time view and as a matter of broad public policy, the undertaking seems dubious in the extreme. Public practice in European cities and the best recent private practice in American cities have demonstrated the social and economic wisdom of leaving at least 50 per cent of open space in modern housing developments. In Europe such developments have in many instances had the aid of state or municipal subsidies. But unless we are ready for subsidized housing in America, is it wise for a municipality to expend public funds for open space all or most of which the developer ought, in any event, to have left unoccupied? And if we can solve our slum clearance problems only by subsidies, can we not expend such funds by some method which will not increase still further the unconscionably high prices already demanded by profiteering property owners from public-spirited citizens who wish to put slum property or blighted areas to good use?

A Prize-Winning Bridge



THE $3,100 Delton Bridge in Sauk County, Wis., illustrated above, has been adjudged the most beautiful structure in its class built in the United States or Canada in 1930. It will consequently be decorated this fall with the bronze plaque of the American Institute of Steel Construction. The Wabash Avenue Bridge in Chicago won the annual award for bridges costing over $1,000,000. No award was made in the medium-cost class.

Buffalo Market Ownership

TO THE EDITOR:

I have just been informed by John J. Herman, Treasurer, Niagara Frontier Food Terminal, Inc., Buffalo, N. Y., that my statement in a recent article which was published in THE AMERICAN CITY for June (pp. 92 and 93) that the market-holding company was a subsidiary of the Erie and Nickle Plate R.R. is incorrect. He states: "The Terminal, consisting of sixty stores, together with land, roadways and other improvements, exclusive of the team track area, is owned by Niagara Frontier Food Terminal, Inc. The entire stock of this company is held by the various produce dealers."

H. E. CROUCH,
In Charge of City Market Projects.

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

A Park in a Ravine

CLEVELAND, OHIO.—The accompanying plan shows a most interesting study for the development of an "in-town" park property in Cleveland, the major portion of which follows through an attractive ravine with boulevards on either side of the ravine at the top of the slope. Such park areas of limited width and extending through areas of a city which will be densely populated with residences and apartments should be considered as a very valuable asset to be preserved for the present and future generations.

Within the past few months a committee of engineers and landscape architects devoted a long period of study to the question whether or not a new major boulevard in the form of a county highway should be carried through the "trough" of this ravine. Fortunately, the committee decided that the park area should not be encroached upon by any boulevard which would have destroyed the major portion of its value as an area for passive recreation. It is the first inclination of many of those who develop highways to select a beautiful park property as an enframement for the highway or boulevard. The decision in this instance has established a precedent, in keeping with decisions of the past under similar circumstances, guarding against the desecration of limited park areas in intensely developed communities by the introduction of thoroughfares in the form of highways or boulevards.

Plans have been developed in a very comprehensive way by this office. The plan provides for a system of trails and walks through the ravine and will eventually provide for the introduction of interesting masses of naturalistic planting. There are many persons who would desire to keep such areas filled with miscellaneous undergrowth as a haven for bird life. Such a condition has existed for many years in this park area with the result that residents on adjoining properties have been worried for the safety of their children while roaming through the wooded area. All such areas should be opened sufficiently for vision clearance for some distance and to give a feeling of safety to children and others. The two boundary boulevards follow the rim of the limited valley. A portion of the park area on the north side of the ravine, approximating 9 acres of comparatively level ground at the rear of a city school, has been suggested for use as a recreation area, and plans have been developed accordingly, as indicated in the drawing.

An interesting object lesson is provided in this property, which was deeded to the city of Cleveland some 25 or 30 years ago to be used only for park purposes; otherwise, the title would revert to the original grantors or their assigns. The property is owned by the city, although three-fourths or four-fifths of it is now in the municipality of Cleveland Heights. With the development of the suburb, the park area has become exceedingly valuable, and should be improved. There is no way in which the suburban community of Cleveland Heights can spend money upon a park property located in Cleveland Heights and owned by the city of Cleveland. The Council of Cleveland naturally is not interested in making appropriations for the normal improvement and maintenance of this park property located outside of the city limits, although owned by the city.

It seems desirable in all such instances that some clause should be inserted in the original deed which specifically gives to the original grantee the option to sell or lease to the adjoining municipality any property which may become of more value for parks and for recreation to the adjoining municipality than to the city to which the property was originally deeded. Such a provision is especially important if the city owning the park property cannot feel justified in making the required expenditures for the logical improvement of such park property in another municipality.

In this instance, long legal opinions have been prepared concerning the status of these properties. It is hoped a method may be found for a logical and proper solution to the problem.

ALBERT D. TAYLOR,
Landscape Architect and Town Planner.

Town-Country Cooperation

SPEARMAN, TEXAS.—That the building of better communities depends upon close bonds of common understanding in all relationships that exist between town and country was the keynote of the recent farmers' banquet here, which was the largest and most enthusiastic of its kind ever held in Spearman. The banquet given by the Chamber of Commerce in the large High School gymnasium was attended by farmers and business men from every part of Hansford and from adjoining counties, and even from

across the line in Oklahoma. Henry Ansley, of Amarillo, well known to most Texans, was toastmaster. W. W. Merritt, President of the Chamber of Commerce, officiated.

Other speakers stressed such important matters as an adequate system of county highways; better cooperation between town and rural schools for the educational progress of the county as a whole. R. V. Converse, Chairman of the Agricultural Committee of the Chamber of Commerce, reported on the Committee's large program of work and on accomplishments to date. Officials of the Santa Fe Railroad expressed their interest in the section, and their genuine desire to assist in its future progress.

Judge A. E. Townsend was among the speakers who emphasized the value of the Chamber of Commerce as an organization prepared to cooperate with every citizen in the county, and an organization in which all may work together for the upbuilding of better communities. Judge Townsend, one of Spearman's pioneer citizens, has often publicly declared that "every man owes his community something and should not be satisfied without giving it his best."

J. W. RATEKIN,
Secretary-Manager, Spearman Chamber of Commerce.

Stopping a Gasoline Tax Leak

OPP, ALA.—If the major leaks in the collection and expenditure of municipal revenue could be stopped, municipal taxes could be reduced and the municipality could enjoy a credit rating comparable to that of good business organizations whose finances run into the thousands.

The city of Opp is a community of only 2,816 people, whose credit standing is really better than the credit of most municipalities of its size. We try to stop our leaks, and we have had an experience the relation of which may prove an incentive to some other municipal organizations.

THE GASOLINE METER

For several years the city has had a gasoline tax (construed as a privilege license tax), the revenue from which is credited to the school budget. We had an ordinance which, prior to June 1, 1930, imposed a tax of 2 cents and 1 cent per gallon on all gasoline sold within the corporate limits and the police jurisdiction respectively. The total revenue from this tax during an arbitrary period of four months was $1,381.55.

Suspicion that this revenue was insufficient was aroused by constant complaints from the filling station operators that the oil companies (who were charged with the duty of collecting and reporting the tax) were discriminating and not collecting the tax uniformly. We were informed that the sales were being billed to fictitious operators living outside our city, but that the gasoline was actually being delivered to operators residing within the city. The responsibility for such simulated deliveries was upon the local distributors, whose manipulations we were unable to check. The complaints also stated that business was being driven out of the city owing to the excessive tax.

The City Council decided to reduce the tax to a uniform price of 1 cent per gallon on all sales made within the corporate limits and police jurisdiction, and to install Neptune Trident gasoline flow meters. The ordinance was changed, and the meters installed.

The results of the change were very satisfactory. The comparable revenue after such reduction, during the four following months, was $1,180. There was a loss during that period of slightly more than $200, but at the same time quite a saving was made to the consuming public to whom this gas tax is passed. We are receiving the cooperation of all the filling station operators and all the gasoline distributors, all of whom now feel, according to our information, that the tax is being collected fairly and without discrimination. The expense of collection was not increased, because the Superintendent of the Water Department reads the meters the morning of the first day of every month and makes his reports to the City Clerk. Local retail sales are increasing.

B. W. SIMMONS,
City Clerk.

Olympic Athletes Will Swim in Pure Water

LOS ANGELES, CALIF.—The world's crack athletes competing in the Olympic Games, to be held in Los Angeles in 1932, will swim in clean water. Not only will the water of the new $110,000 Los Angeles Swimming Stadium be visibly clean, but it will be bacteriologically clean as well. The water-cleaning mechanism will filter the total volume of water three times every twenty-four hours, or once in every eight hours. The water will be purified by a Wallace and Tiernan wet pulsating type chlorinator. This chlorinator will be engineered so that it will be highly efficient and up to the standard of the sixteen existing swim-

ming pools operated by the Department of Playground and Recreation.*

Bacteriological tests were made by the City Health Department which gave the swimming pool water an average of 110 bacteria per cubic centimeter per test sample taken. In none of the tests taken were there any bacilli coli present. This standard is three times better than that required by the California State Board of Health for drinking water and over eight times better than that required for swimming pool water, the state requirement being 300 bacteria per cubic centimeter for drinking water, and 1,000 bacteria per cubic centimeter for swimming pool water.

In order to insure the visible cleanliness of the water, there will be installed a highly efficient vacuum cleaning brush system, with which the bottom of the pool will be cleaned daily before the opening of the pool. This will serve to remove all bathing suit fluff, settled dust and dirt and other matter which is held in suspension during the hours of usage. We expect that by using this modern, sanitary, water-cleaning equipment the bottom of the pool will be visible at its greatest depth, namely, sixteen feet.

The sparkling clear water that the athletes will swim in during the daily hours will be lighted at night by underwater lights, as well as properly placed overhead lights. These will be turned on at all times, except when competition is in progress, when they would be detrimental to the performances of the athletes. The lights will be set in flush with the sides of the pool, so that the bottom will be thoroughly lighted. In order that the under-water lights may be efficient, this high rate of clearness is necessary.

C. P. NICHOLS,
Supervisor of Aquatics, Department of Playground and Recreation.

Davenport's New Municipal Stadium

DAVENPORT, IOWA.—Davenport has a new $185,000 stadium seating 5,500 people, and, in conjunction with it, a new athletic park. The development is between the railroad tracks and the Mississippi River and on a site where but a few years ago there was only a rubbish heap. The undertaking illustrates concretely the aggressive policy of the City Commission to beautify and improve the water line.

The structure is of brick with concrete seats. The aisles are sufficiently wide to facilitate quick and easy exit even when the stand is filled to capacity. Front boxes circle the grandstand; and one of the special features is a press box, with telephone connections to the home team's dugout and the scoreboard.

The ground in the stadium has been well seeded and there is a good growth of turf for the opening season. The diamond is perfectly laid out. The playing field is enclosed with fencing. All this means that Davenport has one of the finest baseball parks in the Middle West. It is located almost in the business district. Previously, the only ground available for organized baseball was at the Mississippi Valley Fair grounds, too far away for convenient attendance.

The dedication exercises opened with a parade in which were the municipal officials, members of the Levee Commission, prominent citizens, and baseball notables. Mayor Tank, after his opening address, threw out the first ball in a match between Davenport and Dubuque. All games for the season, with the exception of those on Saturdays and Sundays, will be played at night. For this purpose the field has been brilliantly floodlighted.

GEORGE T. BAKER,
President, Davenport Industrial Commission.

LIEUT. C. L. HAWLEY
shown demonstrating one of the new Kansas City police uniforms

New Uniforms for Kansas City Police

KANSAS CITY, MO.—Policemen here have new uniform. The old high, stiff caps are replaced with flexible, collapsible headpieces. The coats will have lapels. White shirts, white collars and black ties are also part of the requirement for the new uniforms. Commanding officers wear Sam Browne belts. The Kansas City Police Board decided on this newer style of uniform and ordered the change for the betterment of appearances, which was adopted June 15.

LIEUT. C. L. HAWLEY,
Drillmaster-Inspector.

How a Turkey Started a Zoo

NORRISTOWN, PA.—Several years ago I was presented with a live turkey gobbler on the day before Christmas. I clipped a wing and put it in the new enclosure we had built for the deer provided for our park by the state game warden. One day between Christmas and New Year's, several Italian children were standing along the fence looking in, when the big gobbler strutted out of the shelter house. "Gee, Mister, what is that?" they exclaimed to me almost in one voice. "Not like the big birds hanging in the store windows?" They were amazed. That afternoon the same children were back with, I presume, their parents and grandparents, twelve or fifteen in all; all greatly interested *in seeing a live turkey*. The thought came to me that if a turkey was such a novelty, other domestic fowls and animals might be attractions also. That was the beginning

* See THE AMERICAN CITY, February, 1931, page 152.

f our Zoo.

The original enclosure has been enlarged gradually, and is now divided into four compartments. In addition to this space, we have an alligator pool and cage, and fox and pheasant pens; and, removed from these, three bear pits built from our own original design, a swan pool, an eagle cage, a prairie dog pen, raccoon cages, etc. The zoo occupies an 11½-acre site purchased by the borough and added to the original 32½ acres of Elmwood Park. The park lies along the east side of Stony Creek; two-thirds of it is in woodland; one-third is in primeval forest. We established a small nursery, and from this we every year plant several hundred trees that we have raised from seedlings furnished by the State Forester.

During the summer months, particularly on holidays, thousands of our citizens take advantage of the beautiful shaded area and picnic grounds. Visitors from all surrounding towns swell the numbers. School children are brought in groups to study our zoo exhibits, and I am told by the Superintendent of Schools that the zoo is of great educational value. It is certainly a means of inspiring community cooperation. We have been given a wide variety of animals ranging from bear to peafowls.

Any town that has hills and woods has a splendid opportunity to develop a zoo. In our experience the local government should start it, and let citizens and organizations help it grow. The essential cost is not great in proportion to the pleasure and profit derived. Our zoo, after six years of growth, costs us, for feeding and attendants' wages, $3,500 to $4,000. Animals are not expensive. We paid $1 each for Nebraska prairie dogs, $12 to $15 each for rhesus monkeys, $60 to $65 for bears, $30 for swans, and from $10 to $25 per pair for pheasants. Raccoons and Virginia deer are free from the state.

Our feed bill runs about $20 per month for grain, etc., and about $18 for meat. We raised about 15 tons of hay on our own property last year, and, in spite of drought damage, 123 bushels of corn. Our pumpkin crop was a failure.

S. CAMERON CORSON,
Borough Engineer and Superintendent of Parks.

Community Singing

FOND DU LAC, WIS.—Conclusive proof that people like to participate actively in recreational activity was obtained last summer when, in cooperation with the Park Board and the Municipal Band, the Recreational Department of Fond du Lac experimented with community singing as an added attraction at the weekly band concerts.

At the first concert when the experiment was tried, no publicity was given. When the people arrived, the screen was in recreational activity was obtained last summer when, in cooperation with the Park Board and the Municipal Band, the park benches and bleachers in a semicircle in front of the pavilion. A stereopticon machine was set about 60 feet from the screen. Slides made by the Department were used.

After five or six numbers of the regular concert had been played, a play director, who was an excellent song leader, directed the sing. Songs were flashed on the screen, the band accompanied and the people *sang*. Both popular songs and old folk-songs were encored and had to be repeated. Only five songs were used at the first sing, after which the regular concert was resumed.

Judging from the increased attendance at the second concert, the first sing was a real advertisement for the second. There was barely standing room, and after the singing, people called for songs for which there were no slides. It was with real regret that the experiment was tried so late in the season, which closed with the second sing. In the season which is now opening, we plan to use the screen to announce the name of each band selection; to make attractive slides to announce and close the singing; and to announce at this time future city recreational events and activities.

F. G. KIESLER,
Recreation Director, Public Schools.

Seven Pedestrian Underpasses at One Manufacturing Unit

ACTING upon the belief that industrial safety is very largely a matter of engineering foresight, of so constructing as to remove the possibility of accidents, the Western Electric Co. has carried out the largest safety engineering project in the history of any industrial plant in America with the building of seven pedestrian underpasses at its third major manufacturing unit, the Point Breeze works at Baltimore. These underpasses, embodying the latest features in structural design and modern engineering skill, extend beneath Broening Highway, a fast-travel thoroughfare and a street-railway right-of-way, to connect the Point Breeze manufacturing and administration buildings on the one side with the plant restaurant, future parking areas, athletic field, and other employee facilities on the other. The main purpose of this extensive undertaking has been to provide the utmost in industrial safety and to eliminate congestion on the highway and the street-car right-of-way.

Very careful and exhaustive study entered into the design of these subway tunnels, to the end that they shall accommodate without congestion the estimated number of persons who will use them at the most crowded periods of the day at a time when the Baltimore plant shall be fully completed. The width of the ramps or sloping passageways has been based upon the ratio of thirty persons per foot of width per minute, a modification of the ancient stairway code; and the pitch determined upon, after an analysis of all the factors involved, was 16 inches per 10 feet of travel. As an added safety measure, carborundum grits were troweled into the surface of these sloped passages to give them a non-slip tread.

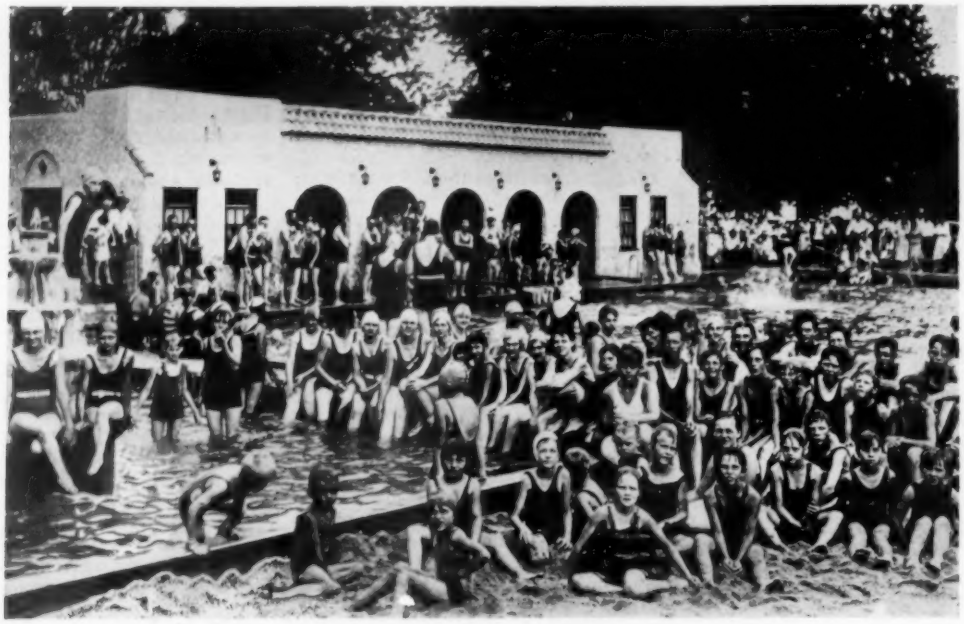
Three of the underpasses are built with twin tunnel entrances on the building side of the highway, each 7½ feet wide, which merge into a single tunnel exit 12 feet wide on the east side. Three more underpasses are constructed as single tunnels 12 feet wide, and a seventh, also of the single tunnel type, is 9 feet in width. All are about 250 feet long and well illuminated throughout with modern style ceiling lights. Motor-driven sump pumps, automatically controlled, have been installed in each to discharge rainwater and insure a permanently dry and healthful passageway.

Skillful construction was necessary to secure dense and waterproof walls for these tunnels, as the lowest point at the surface of each underpass is about 6 feet below the water line of Colgate Creek and the Patapsco River, waterways which border three sides of the Point Breeze plant. To insure against leakage threatened by the ground water pressure, a special type of finely pulverized cement was used in the concrete mix, and as an added precaution a 5-ply waterproofing membrane was placed completely around each tunnel.

R. E. VINING.

ENTRANCE TO ONE OF THE UNDERPASSES

The Outdoor Season Is Here!

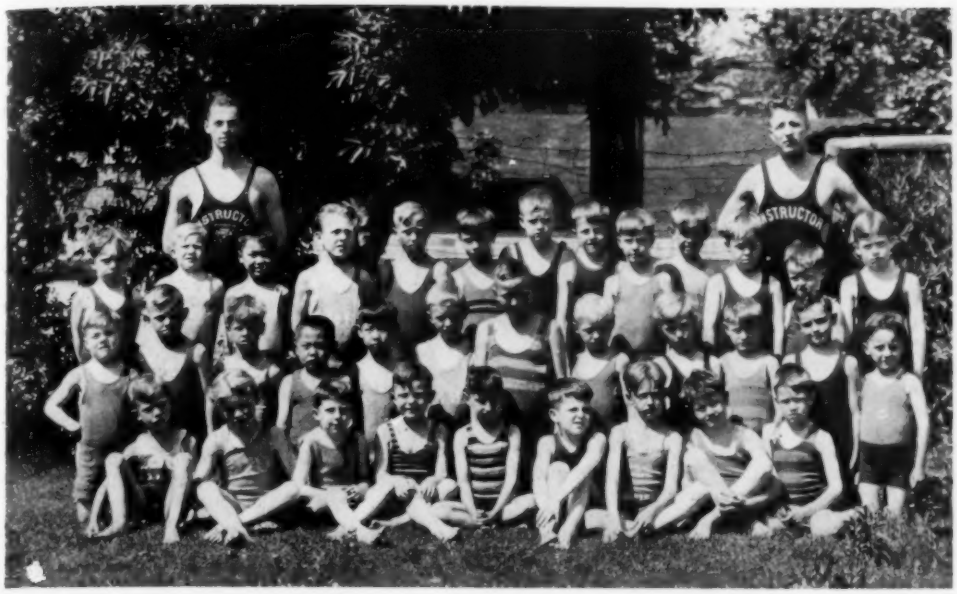


BATHERS AT ST. EDWARD, NEBR.

The new $17,000 municipal swimming and wading pool, completed last season, at once proved popular. The pool proper is 60 by 80 feet, of reinforced concrete. Modern facilities are provided, including night lighting. The side walls are of light green, the bottom white. Scum gutters are concealed. Water sterilization is by the ammonia-chlorine process, installed under supervision of the Perkins Laboratories, the designers and engineers. Chloramines are formed in the water by addition separately of true calcium hypochlorite and 26° aqua ammonia. The water is so clear that a small silver coin on the bottom is visible from above the pool. The bathhouse is Spanish in design, of cream and buff stucco, arcaded on the pool side

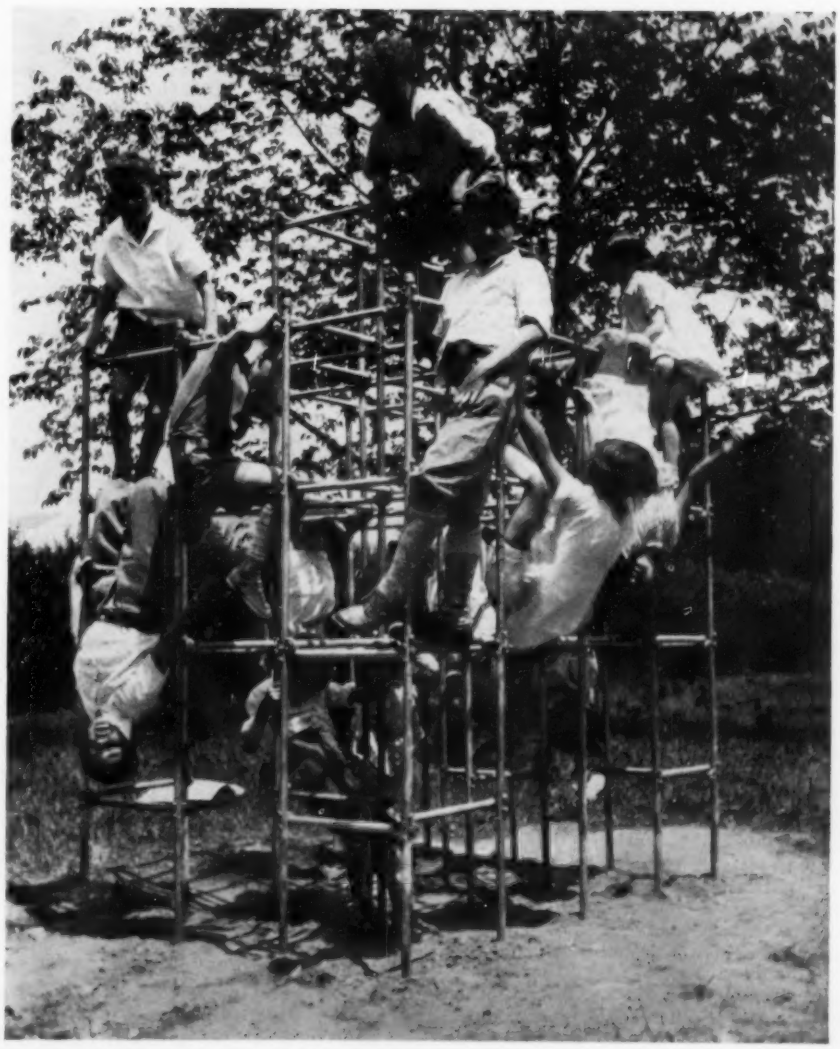
IN LAUREL, MISS.

This concrete oval swimming pool, recently completed, is in a city park where it is surrounded by native trees and shrubbery, thinned out for safe walking. It is part of a general recreation development program for aiding the unemployed. (See The Municipal Index, 1931, Section 13.) It includes an athletic stadium, an athletic field, equipped playgrounds, and large and small parks. Each section of the city (which has 18,000 inhabitants) has *a recreation center and a real beauty-spot.* Laurel was the winner of The American City's recreation contest prize for cities under 50,000



THEY LEARN TO SWIM

The little boys shown above are only a sample of the young swimmers of Yakima, Wash. A thousand children in that city, which has a child population of 3,000, became good swimmers last summer in the campaign conducted by the Park Board and the Physical Education Department of the Public Schools. One hundred classes were conducted, according to Roy Schaetler, Playground Superintendent



ALSO ATHLETES

The youngsters shown at the right are making big muscle, each according to his own idea, on an always entertaining Jungle-Gym, sometimes referred to by recreation directors as the "perpetual motion" apparatus. This scene is on one of the primary school playgrounds at Trenton, N. J.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Street Improvements

Abutting property held assessable for cost of short bridges constructed as part of street improvement.

The cost of three bridges, 18 to 20 feet long, constructed as part of an improvement of streets crossing a ravine, was properly assessed against property abutting upon the street, decided the Kentucky Court of Appeals in the case of *Downing v. Town of Chinnville*, 34 S. W. 2d, 961. The Court said:

"It would have been entirely feasible to have carried the streets across the ravine in question by culverts instead of by bridges. The Board of Trustees, to whom is confided the decision in these matters, chose the method of bridges. The distance to be crossed was not great and the streets had to be carried across the spaces or they would have been useless as streets. Of course, under the guise of a street improvement, municipal authorities cannot construct a bridge over any considerable stream or valley and charge its cost against the property which abuts on the street or streets which lead up to such bridge. In such state of case, the bridge is in no real sense a part of the street within the meaning of the statutes regulating the apportionment of the cost of street improvements. But, on the other hand, where the space to be spanned is not great and can at least be feasibly crossed by culverts, feasibly not only from the engineering standpoint but also from the standpoint of a reasonably economical cost, then whether bridges shall be used instead of culverts is a question which directs itself to the discretion of the legislative bodies of the cities, and that discretion will not be controlled or overridden by the courts, at least where it has not been abused."

Street Accidents

Streets must still be maintained with a view to safety of travel by horse.

It cost a city $5,000, plus interest, court costs, etc., because a rut about 4 feet long, 3 to 5 inches deep and 8 or 10 inches wide, had been permitted to remain unrepaired for about a year, near a corner curb in an asphalt street.

A pony ridden by a boy stepped into the depression and stumbled, injuring the lad. Affirming judgment in his favor, the Kentucky Court of Appeals said (*City of Paducah v. Konkle*, 33 S. W. 2d, 608):

"Of course, the city is not an insurer of the safety of those using its streets, nor is it required to do the impossible thing of providing against a horse slipping on them. It is required to maintain the streets in a reasonably safe condition for the character of travel for which they were maintained. . . . Notice must be taken of the different classes of people that use the streets, and they must be maintained in order for use by these several classes, including children. . . . We have not yet reached the stage of complete evolution from the horse and pony as modes of transportation, and it is still to be presumed that that is a character of travel which may be expected to use the public thoroughfare. A hole in the place of the character described, with an actual knowledge thereof on the part of the superintendent of streets, renders the city liable in damages to travelers who are injured as the proximate result."

Street Rights

City subject to injunction against unreasonably interfering with public service company's conduits.

A telephone company was held entitled to an injunction against defendant city unnecessarily so placing the rails, etc., of a street-railway system as to crush the telephone company's underlying conduits, in the case of *Cincinnati & Suburban Bell Telephone Co. v. City of Cincinnati*, 173 N. E. 45. It appeared that a slight change in locating the tracks would avoid injury to the conduits. Said the Court of Appeals of Ohio for Hamilton County:

"While the location of the conduits is not property, the conduits as constructed do constitute property of the plaintiff. The evidence is that the removal of the conduits would result in their destruction, save some cable salvage. The evidence further is that, to place the car track over and upon the conduits, as provided in the plan of improvement, would result in crushing them. The necessary legislative authority having authorized and directed the laying of the conduits, as to the location, the plaintiff is entitled to the right of protection to its property as against unreasonable, unnecessary, and unwarranted acts of the city under the exercise of its police power, resulting in the destruction of the conduits."

Falling Trees

Town held liable for fall of decayed tree upon abutting property. Abutter not liable for fall of tree upon highway.

Two very recent decisions afford an interesting comparison upon the subject of liability for injuries caused by falling of decayed trees.

In the case of *Jones v. Inhabitants of Town of Great Barrington*, 174 N. E. 118, the Massachusetts Supreme Judicial Court recognized that a municipality may be held liable for falling of a tree upon abutting property, where it has been permitted to stand in a highway in a condition so decayed and dangerous as to make its fall imminent.

But in the case of *Chambers v. Whalen*, 44 Fed. 2d, 340, the United States Circuit Court of Appeals, Fourth Circuit, decided that an owner of rural lands was not liable for injury to a traveler on a highway, caused by falling of a decayed tree standing on such lands. The decision, however, was influenced by a West Virginia statute, imposing a duty upon highway authorities to remove dead timber standing within 50 feet of highways. The Court said:

"The inspection and removal of trees standing near a highway is, in substance, not a matter affecting the use of the abutting property, but a matter affecting the safety of the road. While of course it is the duty of abutting owners not to create or maintain upon their premises what may be a source of danger to travelers on the highway, it is the duty of the highway officials, and not the duty of abutting owners, to make the highway safe for the use of the public; and the duty of inspection would seem to rest upon those whose duty it is to make the highway safe. It is hardly thinkable that by building a country highway through the lands of a private owner, the public should impose upon him the duty of inspecting trees or other objects for the purpose of making the highway safe. . . .

"Is the owner of mountain land to be held liable for failure to inspect because a boulder rolls from his land on the mountainside to the highway, or because there has been a landslide, or because water flowing in natural course from his land has frozen upon the highway? If not, we see no ground upon which liability in a case such as this can be imposed."

Recall Elections

City Clerk's duties under recall statute held purely ministerial.

The City Clerk of Hamtramck, Mich., refused to call an election to recall the Mayor, questioning the genuineness of some of the signatures on the petition, although they were supported by affidavit of the circulator of the petition. The Clerk also claimed the right to investigate concerning fraudulent signing or circulation of the petition, and pass upon the sufficiency of the reasons stated for recalling the mayor.

Directing that the Clerk be required to call the election, the Michigan Supreme Court said in the case of *Karwick v. Grazewski*, 234 N. W. 168:

"The recall statute vests no discretion in the city clerk or other official with whom the petitions are required to be filed. His duties are entirely ministerial. They are confined to such an investigation only as will enable him to determine whether the petitions contain the requisite number of signatures with the residence, street number, ward, and voting precinct of the signers. Excepting that he may examine the poll lists of the districts of the city of Hamtramck to determine the number of electors voting for Governor at the last preceding election, he must make the canvass from the petition itself."

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Ordinances and Statutes

NEW JERSEY.—Jersey City, ordinance, February 6, 1931.

NEW YORK.—Statute, 1931, Ch. 331 (with relation to hearings on changes in zoning ordinances).

NEW YORK.—Babylon, ordinance, April 27, 1931.

NEW YORK.—Scotia, ordinance, April 27, 1931.

PENNSYLVANIA.—Forty Fort (borough of Lucene County), ordinance, January 12, 1931.

PENNSYLVANIA.—O'Hara Township, ordinance, April 7, 1931.

WISCONSIN.—Statute, 1931, Ch. 124 (creating state regional planning committee and providing for zoning of river valleys.)

Miniature Golf

ALABAMA.—*Drennen v. Mason*, 133 So. 689.—The profitable use of vacant property zoned as residential is not in itself a nuisance to residents therein.

The classifying of a miniature golf course as a "playground" rather than "an amusement park operated for profit" is a reasonable construction of the zoning ordinance in question (that of the city of Birmingham).

The facts proved in this case do not show that the miniature course was a nuisance in fact.

NOTE BY EDITOR: This case would seem to be contrary to the weight of authority on this subject.

Boards of Appeal

CONNECTICUT.—*St. Patrick's Church Corporation v. Daniels*, 154 A. 343.—Boards of appeal are justified in acting on successive applications for using the same premises for a parking station. The test is whether additional facts show a change of conditions intervening since the former decision.

Farming

CONNECTICUT.—*Chudnuv v. Board of Appeals of Town of Bloomfield*, 154 A. 161.—That zoning regulations allowing farming in a residence zone specified, in addition, truck-gardening, nurseries and greenhouses negatived intent that enterprises less obviously related to farming be allowed.

The test whether a proposed use of property in a residential zone is "farming" is whether the use is incidental to farming operations or is an independent and dominant enterprise. The proposed use of less than a 3-acre tract for a poultry house for 800 to 1,000 hens is therefore not permissible.

Reasonableness—Boards of Appeal

GEORGIA.—*Fauss v. McConnell*, 157 S. E. 625.—The application of a zoning law to permit business on the front of a lot and restrict the rear to residence is unreasonable.

Where a zoning law is unreasonably applied, the property owners' failure to give notice of appeal to the zoning board is immaterial.

Notice

ILLINOIS.—*Cain v. Lyddon*, 175 N. E. 391.—Within statutory limits laid down, cities may prescribe details regarding hearings and notice in the matter of amending zoning ordinances.

An ordinance prescribing that an ordinance amending a zoning ordinance shall not be offered for passage until ten days after presentation is not inconsistent with the zoning statute of this state, or unreasonable. An amendment not fulfilling this condition is invalid.

Residential District—Variance

MASSACHUSETTS.—*Marinelli v. Board of Appeal of the Building Department of Boston*, 175 N. E. 479.—Where a railroad company, having deprived a fuel company of transportation facilities by abandonment of freight operations in a certain section of a city, entered into an agreement with the fuel company to relocate the fuel company's place of business in another freight yard which was placed in a residential area by a zoning law enacted after the agreement was entered into, but before the relocation of the fuel yard therein, the Board of Appeal of the Building Department of the city did not act arbitrarily in varying the application of the zoning law so as to permit the construction of a hopper, a coal pocket, scales, an office building and storage space within the freight yard, with the proviso that the coal pocket be kept 100 feet back from a nearby highway and that the elevators and coal pocket be enclosed and lined and made as near dustproof as possible, in view of the right of the railroad company under the zoning law to continue to use the land as a freight yard, the similarity to such use of the use of a portion of the yard by the fuel company, and the dependence of the fuel company upon adequate railroad facilities.

Zoning Building Lines — Corner Lots

MICHIGAN.—*James S. Holden Co. v. Connor and Baker, Building Commissioners of Village of Grosse Pointe*, Circuit Court, Wayne County, April 25, 1931.—A village zoning ordinance provided that on a corner lot there should be a side yard along the side street lot in all cases where such line is substantially the continuation, without intervening streets, of the street lot line of lots in an adjoining residence district, or of adjoining lots in a local business district on which a front yard is required in the ordinance.

The lot in question was in a business district.

Held, that the village was authorized to pass the ordinance under its authority from the Legislature "to lower congestion on the public streets, to promote public health, safety and general welfare, conservation of property values, and the general trend and character of buildings and property development."

Held, also, that this ordinance, although applying only to corner lots, was valid.

Park

NEW JERSEY.—*Baird v. Board of Recreation Commissioners of Village of South Orange*, 154 A. 204.—A deed conveying land to a municipality for a "public park" or "public playground" limits its use to enjoyment by the public at large for games without admission fee.

Trees

NEW YORK.—*Village of Cattaraugus v. Johnson*, 139 Misc. 368.—Where a lot owner's title extends to the center of the street, the fee is in the owner of the lot and the rights of the village are paramount only for street purposes. Therefore, the title in fee to a tree therein is in the owner, and an ordinance prohibiting the destruction of shade trees in streets or parks gives the village no authority to penalize the owner for cutting down the tree.

Billboards

NEW YORK.—*Perlmutter v. Greene, Superintendent of Public Works of State of New York*, 140 Misc. 42.—The case is of so much interest that the opinion of the Supreme Court is here given in full:

"Plaintiffs seek to obtain a permanent injunction restraining the defendants from erecting a screen upon the property of the state of New York immediately south of the east approach of the Mid-Hudson bridge and in front of a piece of property of which the plaintiffs are the lessees.

"The plaintiffs intended to erect on the leased property an advertising sign. The defendant has so erected its screen as to prevent motorists using the bridge from seeing the sign.

"In the defendants' brief they maintain that the object of placing the screen in its present position is to prevent motorists from seeing the sign and thus afford no reason for their taking their eyes off the wheel.

"I am satisfied that this position is an afterthought. The original motive was purely esthetic.

"The authorities relating to the erection of screens and fences upon private property cannot be construed as precedents in an issue between the public and a private owner.

"I do not believe that the state has any right to build screens along its highway, thus shutting out the view of the adjacent owners or the view of travelers upon the highway of adjacent property, unless the screens are erected in furtherance of a highway purpose. It cannot be claimed that the erection of this screen is a highway purpose within the act, unless the Court should find as a matter of fact that it was erected for the purpose of safeguarding the motorists, a fact which I refuse to find.

"It is contended that under the police power of the state this screen may be erected. Courts have gone far in upholding the police power, but never to the extent demanded here. Unless there is an express right granted by the Legislature to do this act, the Court would not be justified by implication in holding that the defendant possessed that power. If this were permitted in one instance it might be done in every instance where the Superintendent reached the conclusion that a particular type or form of building attracted the attention of motorists, and any part of the highway might be screened in the discretion of the Superintendent.

"I am greatly in sympathy with the effort to remove obnoxious signs along the public highway, but it is recognized that we cannot prevent their erection on private property and a decision upholding the right of the Superintendent to erect screens would not result in the solution of the problem. With the adoption of the proposed constitutional amendment" (similar to that in Massachusetts allowing the State Legislature to pass laws regulating billboards for esthetic reasons) "the problem would be solved, but not otherwise.

"The prayer for the relief demanded in the complaint is therefore granted."

Esthetics

PENNSYLVANIA.—*Walnut and Quince Streets Corporation v. Mills*, 154 Atl. 29.—The statute creating a Municipal Art Jury for the city of Philadelphia, whose approval of structures on or over highways is an essential prerequisite, *held* constitutional, as against objections based upon omissions of definite standards governing the jury's discretion, since appellant has no vested interest in the use of the public streets. The appellant's point that the power to regulate, for esthetic reasons, the type of structure to be erected over the public streets is unconstitutional is not well taken. The power of the state to exercise and delegate the power to regulate esthetics on public property has for many years been universally recognized.

NOTE BY EDITOR.—The opinion refers to this power as the "police power." It would seem rather to be the power of the municipality to deal with property owned by it.

Filling Station in Residential Neighborhood

PENNSYLVANIA.—*Long v. Firestone Tire and Rubber Co.*, 154 A. 364.—An injunction against establishing an automobile filling station in an exclusively residential section will be granted.

NOTE BY EDITOR: There seems to have been no zoning ordinance.

Private Covenant—Stable

PENNSYLVANIA.—*Culp v. Firestone Tire and Rubber Co.*, 154 A. 479.— A covenant in a deed against the erection of a stable does not preclude the erection of a garage.

Garage

TENNESSEE.—*McKelley v. City of Murfreesboro*, 36 S. W. 2d, 99.—An ordinance prohibiting the location of oil or gasoline filling stations within a certain defined area is valid.

NOTE BY EDITOR.—The ordinance, with regard to a special use in a special part of the city, was piecemeal zoning; there seems to have been no zoning ordinance, properly so called, for the city.

Nuisance—Undertaking Establishment

WASHINGTON.—*Haan v. Heath*, 296 Pac. 816.—An undertaking establishment, though not a nuisance *per se*, may become so by reason of surrounding circumstances. The owners of property in an exclusive residential section were entitled to damages by reason of the location of an undertaking establishment therein.

Lumber Yard—Reconstruction of Non-Conforming Use

WASHINGTON.—*State ex rel. Modern Lumber and Milling Co. v. MacDuff, Building Inspector*, 297 P. 733.—Defendant is the owner of a considerable tract of land in the city of Tacoma consisting of several lots upon which he has for many years been conducting, as a single enterprise, in a number of buildings, a lumber factory, salesroom and yard. Subsequent to the beginning of such use, part of the tract was zoned as a retail business district, part as a residential district. The lumber-yard building was in the residential district, and was not in any way a nuisance. It has burned down, and the owner applying for a permit to reconstruct it for its original use, has been refused the permit. The zoning ordinance allows the continuance of a non-conforming use, but not reconstruction for such a use.

Held, that the refusal of the permit is unreasonable and the portion of the ordinance requiring it, void.

NOTE BY EDITOR: It should be noted that, evidently, there was no board of appeals created by the zoning ordinance of the city, with power to grant relief in cases of unnecessary hardship.

State Planning

Wisconsin, by laws of 1931, ch. 124, has provided for the creation of a "state regional planning committee." The powers of the committee are very largely advisory.

Regional Zoning in Los Angeles

The fifth annual report of the zoning section of the Los Angeles County Regional Planning Commission, covering activities for 1930, in addition to a general account of progress, contains a review of some of the important cases decided by it during the year.

County Planning in California

The Los Angeles Chamber of Commerce in its Civic Development Bulletin, No. 19, 1931, in typewriting, gives an account of the proper "Procedure under the California Subdivision Map Act with Particular Reference to County Planning." The Bulletin was prepared by Hugh H. Pomeroy, City and County Planning Advisor.

Zoning in Denver

The Sixth Annual Report of the Board of Adjustment covers the activities of that body for February 11, 1930, to February 11, 1931. As usual, the report gives a summary of decisions of the Board, which are of general interest. Illustrations greatly add to their value to the reader.

Zoning in the Chicago Region

The Chicago Regional Planning Association, 412 Burnham Building, through its Committee on Subdivision Plats and Zoning, in May, 1931, has issued in convenient tabular form a "Charter Summary of Zoning Ordinances in the Region of Chicago." The regulations of 78 cities and villages, including the city of Chicago, are thus covered.

Planning in Massachusetts

The Massachusetts Federation of Planning Boards, in its Bulletin No. 26, gives a full report of the Seventeenth Annual Conference of the Massachusetts Planning Boards in Boston, September 30 and October 1, 1930. The Conference gave much of its time to regional planning; and considered also city planning legislation, zoning, and the progress of the Billboard Law Defense Committee in its contest before the courts in support of the control of outdoor advertising. In addition to speakers from Massachusetts, the Conference was addressed by Dan H. Wheeler, Division of Building and Housing, U. S. Department of Commerce, and Edward M. Bassett and Lawson Purdy, of New York.

Zoning in the United States

A most considerable contribution to the planning literature of this country is "Zoning in the United States," being Part Two of the *Annals* of the American Academy of Political and Social Science for May, 1931. It is edited by W. L. Polland, of Los Angeles, and contains articles on almost every phase of the subject by well-known authorities.

Planning in Michigan

The City Planning Enabling Act passed at the last session of the Michigan Legislature has been signed by the Governor, and is now law. The Act, sponsored by the Michigan Planning Conference, follows closely the Department of Commerce Act, except that the legislative body is forbidden to rescind a street opening or widening resolution without a reference to the planning commission and a public hearing.

THE TAXPAYER'S DOLLAR

A Monthly Department of Budgeting, Assessment, Taxation, Accounting and Other Phases of Municipal Finance, Conducted by A. E. BUCK, National Institute of Public Administration, New York

Cost System for Sanitation Activities Installed in Kenosha, Wis.

THE Committee on Uniform Street Sanitation Records has recently completed the installation of a cost system for the sanitation activities in the Public Works Department of Kenosha, Wis. This installation was undertaken for the purpose of demonstrating to other cities of the country, with populations around 50,000, just how the Committee's proposals can be practically applied and the aid that can be given to city officials in the management of street sanitation activities. A previous installation, which we noted in last month's issue, was made in Brunswick, Ga., to demonstrate the application of the system to a much smaller city than Kenosha. Both installations were made under the immediate direction of Donald C. Stone, assisted by G. A. Moe.

The Committee says that the main objective of the cost system is to provide the several public works officials and the city manager with greater control over street sanitation and other public works activities. The system provides a uniform method for compiling and analyzing the costs of work done, thereby enabling these officials to plan the work more effectively, to prepare the budget on a work program basis, and to determine the extent to which work performed conforms with work budgeted. It is hoped thereby to produce more and better work in these activities for the money spent.

The records installed aim at keeping an accurate account of all work performed. This will enable the work to be equally distributed between various crews and pieces of equipment, preventing some crews from having more than their share of the work, and some pieces of equipment from remaining idle for part of the time. It is possible with this aid to plan refuse-collection and street-cleaning routes systematically rather than by guess. As a result, Kenosha's 78 men and 35 pieces of rolling equipment, representing an annual operation of about a quarter of a million dollars, can be marshaled, it is hoped, so as to produce the greatest amount of service for the citizens.

Kenosha is fortunate in having an effective general financial system with which the cost records can be made to dovetail, thus assuring better results in the end. Budgeting, especially with regard to the work program and monthly reporting, is in advance of most cities in Kenosha's class. This greatly decreases the difficulties of programming the sanitation activities and applying costing to them. We have every reason, therefore, to believe that the installation will prove quite successful as a demonstration.

Ohio Supreme Court Passes on Special Assessment Bonds

MORE than twenty years ago the Ohio Legislature enacted the sanitary sewer act which enables the counties of the state to create sanitary engineering departments for the purpose of constructing sewer and water systems in outlying undeveloped areas adjacent to a growing city. Cuyahoga County took advantage of the provisions of this act in 1921. The department thus established has constructed, since that time, over 300 miles of water mains and over 290 miles of sewers, costing in the neighborhood of $20,000,000. The work seems to have been done satisfactorily, so the Citizens League of Cleveland reports.

Difficulties seem to have arisen, however, in connection with the method of paying for these improvements. Under the law the county advances the money in the form of bonds to meet the cost of the improvements, which is to be later collected as special assessments against the property presumed to have been benefited. The total accumulated delinquencies in these special assessments, says the League, have increased until there are now thousands of parcels on which the delinquencies are more than the assessed value of the property.

A case involving these special assessment bonds came up to the Ohio Supreme Court, which handed down a decision on February 11. Briefly, the Court held that the county is not liable for the payment of these bonds issued in anticipation of the collection of special assessments which have become delinquent, and that the county cannot be compelled to make appropriations out of the general fund even to pay the delinquent accrued interest on such bonds.

The League says that this decision is far-reaching in its effect, that it is a blow not only to the county sanitary department, but to all the municipalities that have made similar bond issues a lien on benefited property. The effect is so serious that the various public authorities of the state have sought a rehearing in the case, which the Supreme Court has granted.

Is Detroit "Broke" or "Short"?

THE Detroit Bureau of Governmental Research in one of its recent leaflets asks the question: "Is the city of Detroit 'broke' or 'short'?" and proceeds to answer it by saying that it is short—very short.

The Bureau points out that there are three chief causes of this situation, namely, delinquent taxes, unassessed benefited property, and a welfare deficit. On April 1 of this year $16,480,153 of taxes were delinquent, or $5,416,447 more than last year. It is probable, the Bureau says, that the tax-title buyers will purchase only $3,000,000, and the payments before June will be another $3,000,000, leaving $10,000,000 on the city's hands. The city will have become the owner of property representing this large amount of taxes, only a portion of which will be redeemed at an early date, and in the meantime must finance this amount by short-time loans.

The cost of street openings and widenings which have not been assessed by the City Council upon the benefited property owners or upon the city at large, amount to $10,225,854, although the money to pay the court awards has been advanced from short-term loans. In addition, the city is financing special assessments totaling $6,968,732 because they are delinquent or not due, and $2,647,000 to meet special assessment bonds which have matured.

The Bureau estimates that the deficit for welfare work will probably reach $17,000,000 by the end of the fiscal year, June 30,1931. Taxes have not been levied to meet this deficit, or for the additional deficit which will be incurred next year.

The City Comptroller must advance money from the general fund to meet these various shortages, and at the same time meet the payrolls and other expenditures. The Bureau regards this as a rather vexing state of affairs for the Comptroller, and it proceeds to cite conditions in several other cities by way of encouragement.

Duluth's Tax Burden a Matter of Local Concern

THE Taxpayers' League of St. Louis County, Minn., in a recent printed statement, thinks the tax burden of the city of Duluth has become a matter of concern to the local taxpayers and suggests certain things that should be done by the city authorities, the Board of Education, and the county government. The League points out by way of introduction that Duluth is only twenty-fourth from the top in per capita general property tax among the 250 cities in the country with populations in excess of 30,000. The per capita general property tax levy is $63.83.

The League insists that the city authorities should begin now to determine possible reductions in next year's budget. "One improvement in the budgeting procedure," says the League, "would be for the Commissioner of Finance to submit a budget which his department recommends for the consideration of the City Council. In previous years the budgets submitted to the Council have been mere compilations of the department requests. In other forms of government, the chief executive submits a recommended budget, but in a commis-

sion form such as Duluth's, such a task—if it is to be done—must be done by the Finance Department. If the Department of Finance would undertake to recommend a balanced budget, together with such reductions as it believes to be possible, it is more than likely that next year's levy can be cut materially."

The League also urges that the Board of Education begin immediately to study every possibility for reducing expenditures. It says: "The time has arrived when the people must cut out maudlin sentiment about schools and get down to hard-boiled common sense. Schools everywhere have been running away with the taxpayers' pocketbook, and the citizens themselves are largely to blame. There are many possibilities for reducing school taxes, but to do so requires a revision of our ideas of what constitutes absolute necessities. The Board of Education can point the way, and it is up to the public to support its suggestions."

Finally, the League points out that the County Board has a great opportunity to reduce its tax levy. "There are many departments and expenditures," says the League, "that can and should be reduced or eliminated, and the road and bridge levy could be cut substantially without hurting any one. In the past two or three years the County Board has almost revolutionized the manner of administering the road funds. A greater return to the taxpayer is being rendered today than ever before. This increased efficiency has not as yet been revealed in the tax rates. Next year offers an opportunity for giving the taxpayers the benefit of these improved methods. The department officials should recognize a responsibility to reduce their operating expense, and if such a responsibility is taken seriously, there can be no question but what the taxpayer will benefit materially."

In Explanation of St. Louis' Deficit

EXCEPTION was taken by the Comptroller's Office of St. Louis to the statement, entitled "St. Louis Reported Two Million Dollars in the Red," which appeared in this department (page 151) in the May issue. A letter from A. C. Meyers, Engineer to the Comptroller, says in part:

"The deficit in the Municipal Revenue Fund at the close of last fiscal year, April 13, 1931, as shown by the Comptroller's books, was $96,842.44, not $2,000,000 as the article referred to stated might be the amount; and that, too, notwithstanding the fact that $450,000 was appropriated for relief of the unemployed during the winter months, $300,000 of which was disbursed through a Citizens' Committee on Relief and Employment, under supervision of the Comptroller."

Since our statement was based upon a bulletin published by the Bureau of Municipal Research of St. Louis, a copy of Mr. Meyers' letter was sent to Carter W. Atkins, Director of the Bureau, for his comment. Mr. Atkins asserts that "all the figures on the deficit in the city's Municipal Revenue Fund came from the Comptroller's office," and makes the following statements in explanation:

"When we asked in February for an estimate of the deficit, it was given to us as 'about $1,500,000.' As stated in our bulletin of February 28, a check-up of appropriations showed that they exceeded estimated revenues by $1,930,851. It therefore seemed reasonable to state, 'It is estimated that the deficit in the Municipal Revenue Fund . . . will be at least $1,500,000, and it may reach $2,000,000.'

"A second estimate of the deficit was given out by the Comptroller at the opening of the 1931-32 budget hearings on March 20, when he was quoted by the newspapers as saying that the budget deficit would be $800,000.

"A third estimate of the deficit of $286,650 was given out by the Comptroller's office on April 21, with the statement that while this would be changed by the final figures, the change would not be more than $10,000 either way. That estimate was used in our bulletin of May 11 in which we stated, 'The deficit is fortunately much smaller than earlier estimates made by officials in charge of the budget which the Bureau used in its published statements.'

"A fourth figure of $96,842.44 is now given in the letter which you have received from the Comptroller's office.

"In view of the circumstances, the Bureau declines at this time to add to the confusion by giving another estimate of the deficit before it has had an opportunity to see the annual report of the Comptroller, which we understand will not be available for several weeks."

Chicago's Financial Plight Grows Worse

ON June 3, Mayor Cermak of Chicago asked the Illinois Legislature to pass several bills aimed to help the city out of its financial crisis, but the Legislature postponed definite action. Perhaps the most important of these bills was one that would abolish the elective boards of Cook County assessors and reviewers and substitute an appointive board of three members. The Chicago bankers say that unless this bill passes the Legislature, they will buy no more tax anticipation warrants.

Mayor Cermak told the members of the Legislature that unless some relief was forthcoming, he could not predict what would happen. "We owe," he said, "$6,000,000 in unpaid salaries of school teachers, firemen, and policemen. We are paying no bills, for we have no money. There is $150,000 in the city treasury. The banks will buy no more tax warrants, and if we don't get revenue, almost 50,000 people will be cut off the payrolls."

Unpaid payrolls of the city on June 2 were estimated at $2,700,000, and the School Board's payrolls approximated $4,500,000. To meet its payrolls the Chicago Edison Company agreed to loan the city $2,000,000, in advance on tax moneys due late in June.

Tax anticipation warrants outstanding amount to nearly $300,000,000. The local banks are loaded up with them. When the tax bills for 1929 were sent out, only a few weeks ago, a large number of property owners refused to pay them. It is reported that court action by some 3,000 property owners has been started to prevent the collection of 1929 taxes on 10,000 parcels of real estate, valued at about $400,000,000.

Cook County is reported to have defaulted, on June 1, in the payment of $1,868,400 of bonds and interest. More than $20,000,000 in bonds of the local governments in that county are due before the end of the year. Of this total, more than $8,000,000 of bonds are due July 1. None of the local governments which issued these bonds has the full amount of cash at present to meet its bond and interest payment for the remainder of 1931. Some of the bonds falling due are payable out of the 1929 taxes, of which less than 58 per cent has been collected. The taxes of 1930 must be relied upon to pay others, and these taxes have not been assessed. The valuation of property on which to make the 1930 assessment has not been completed.

Portland Has Difficulty in Balancing Budget

CITY MANAGER JAMES E. BARLOW presented the budget of Portland, Me., to the City Council on April 27. It totaled $4,520,918. After considerable discussion as to methods of financing the budget, the Council passed the annual appropriation bill on May 18, totaling $4,470,918. This is approximately equal to the aggregate appropriation of the previous year.

There is an estimated decrease in the city's tax roll of some $500,000, making the total valuation for 1931 something like $114,250,000. This means a tax rate equally as high as that of last year, or $33.60 per thousand. Even so, certain permanent improvements are being met by bonds. City Clerk A. Edwin Smith informs us that the Council has authorized the sale of $180,000 of improvement bonds during 1931. The receipts from these bonds are to pay for the purchase of land, construction of sewers, schools, and highways.

Budget of Toronto Said to Be Approaching Danger Mark

THE Bureau of Municipal Research of Toronto, Ont., indicates in a recent leaflet that the budget for 1931 of that city is approaching the danger mark. The budget total is in the neighborhood of $37,000,000. This represents expenditures on general current account, per person, of $59.50, or per family of five, of $297.50, which are considerably above the corresponding figures for last year. If the ratepayers' share of local improvements were included, the total amount of the budget would be about $40,000,000.

The Bureau says that the outstanding increases over the budget of the previous year are in general government, education, and charities and correction, and that the increase in total estimated current expenditure is almost 6½ per cent.

The Municipal Bond Market

By SANDERS SHANKS, JR.
Editor, *The Bond Buyer*

THE typical investor is as cautious today as he was reckless in the boom period which culminated in the crash of 1929. This is clearly evidenced by the remarkable spread between short-term and long-term money rates and the equally remarkable spread between the price of ultra-conservative securities and so-called second-grade issues. Within a few days, we find the city of Boston arranging a short-term loan at an interest rate of 1.09 per cent, and the state of Louisiana paying 4½ per cent on a highway bond issue backed by the full faith, credit and resources of the Commonwealth, with the gas tax specifically pledged as the primary source of revenue to cover the service of the loan.

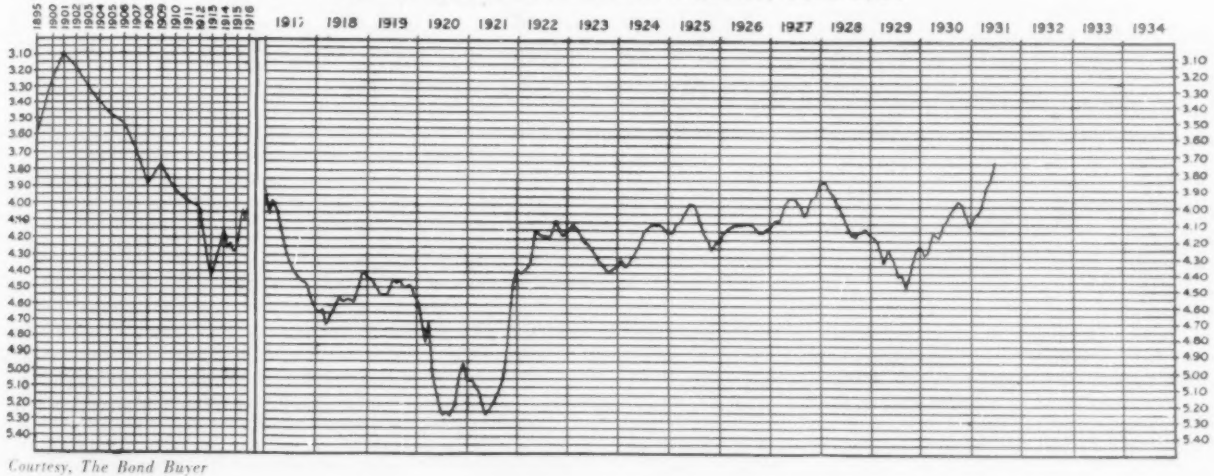
The market for state and municipal bonds so far this year has been advancing almost steadily, with, as pointed out, the best-grade issues appreciating to a much greater extent than the rest of the list. As a whole, however, this class of securities has recently reached the highest price level seen since the early 1900's. And this has been achieved over a period of months during which a record volume of new borrowing has been negotiated. Even more remarkable is the fact that, at the very time when the preference of investors for municipal bonds has been so marked, there have come to attention many cases of municipal insolvency and default resulting usually from either poor tax collections or loss of public funds through bank failures.

The recent U. S. Government financing through the medium of twelve- to fifteen-year bonds exerted an unfavorable influence on the municipal market, but this appears to have been of a temporary nature. Following closely upon the new Treasury flotation, however, a considerable volume of new state, county and municipal issues came on the market, and this has tended to keep prices from making any further advance from the June 1 level. The second half of the year will probably prove to be a period of substantially less voluminous borrowing by states and local governmental units.

The following representative list of sales of state and municipal issues indicates the current level of municipal bond prices:

Amount	Municipality	Rate (%)	Maturity	Net Basis (%)
$277,000	Durham, N. C.	2¾	6½-mos.	2.74
2,330,000	Albany, N. Y.	3½	9½-yr. (avg.)	3.30
1,800,000	Paterson, N. J.	3½	13¾-yr. (avg.)	3.45
4,000,000	California	4	13 1/3-yr. (avg.)	3.58
530,000	Milwaukee Co., Wis.	4¼	11-20-yr. (ser.)	3.75
50,000	Burlington, Vt.	4	27½-yr.	3.84
23,000	Cleveland Heights, Ohio	4¼	4¾-yr. (avg.)	4.13
20,000	McMinnville, Ore.	4½	2-11-yr. (ser.)	4.35
18,433	Port Huron, Mich.	4½	6¾-yr. (avg.)	4.42
15,000,000	Louisiana	4½	17½-yr. (avg.)	4.49
38,000	Clarksville, Tenn.	4¾	10-20-yr. (opt.)	4.71
35,000	Marcy, N. Y.	4.90	16 2/3-yr. (avg.)	4.89
800,000	Galveston, Texas	5	16½-yr. (avg.)	5.05
5,500	Palatine, Ill.	5	6 5/6-yr. (avg.)	5.44

TREND OF MUNICIPAL BOND PRICES, 1895-1931



Courtesy, The Bond Buyer

Massachusetts Billboard Regulations Upheld in Master's Report

A REPORT which it is believed will result in the sustaining by the Supreme Court of Massachusetts of the now famous billboard regulations of the Division of Highways of that Commonwealth, was filed on June 2 by Frank H. Stewart, Esq., as Master. The regulations in dispute had been promulgated in 1924 in accordance with a legislative act of 1920 under authority of the Massachusetts Constitutional Amendment of 1918, which granted the power to regulate and restrict advertising in public places and on private property within public view.

The report finds on evidence taken over a period of three years that the regulations* are reasonable in themselves, and are framed for the purpose of protecting the health, safety and welfare of the people; that they do, in fact promote that health, safety and welfare; and that a readjustment of non-conforming signs can reasonably be made to comply with the newer regulations. Billboards and signs located at curves and intersections tend to divert the attention of the driver and thus become a menace to safety through distraction of vision, the report asserts, and the fact is recognized also that billboards depreciate preperty values in home neighborhoods. Pointing out that the Division of Highways made the factor of "scenic beauty" an element in determining when a permit should be refused, the Master found that "beauty in the sense intended and employed in the framing and administration of the rules and regulations has, in fact, a real and substantial economic value to the Commonwealth and to its citizens."

* The regulations in question provide among other things that no permits will be granted for billboards within 300 feet of public parks and reservations, if within view of the same; no signs of any type may be erected within 50 feet of a public way, except in business districts; no billboards may exceed a length of 50 feet and height of 12 feet, or a length of 40 feet and height of 15 feet, and billboards of these dimensions must be 300 feet back from the right-of-way. Also, no permits will be granted along highways where in th opinion of the Division, having regard to health, safety, danger of fire and unusual scenic beauty, billboards and signs would be particularly harmful to the public welfare.

ALBERT S. BARD.

TRAFFIC CONTROL AND FACILITATION

Conducted by the Institute of Traffic Engineers, 175 Fifth Avenue, New York

Publications Committee: Maxwell Halsey, Chairman, Hawley S. Simpson, Harry H. Hemmings, Arthur G. Straetz

The New North Broad Street Signal System, Philadelphia, Pa.

CONTRACTS have been awarded and work is now proceeding on the manufacture of equipment and installation of a new traffic control system on North Broad Street in Philadelphia, Pa., from Filbert Street to Roosevelt Boulevard, a distance of about 5 miles.

The roadway in general has a width of 69 feet, allowing traffic to move in three narrow lanes in each direction, with one lane for parking. Street lights are located on small islands along the center of Broad Street at each intersecting street.

The design of the flexible progressive traffic control system was based on considerable study. Some of the main features of interest follow:

1. A master controller located in City Hall, designed for an eventual system of 300 intersections, in ten sections.

2. Control apparatus at each intersection, which may be set to permit progressive movement in both directions on Broad Street.

3. The total time cycle may be varied at the master controller for the entire system.

4. The percentage of total time at each intersection, allotted to the different signal indications at that intersection, may be varied between wide limits to suit local requirements.

5. It is possible to control signals manually at certain intersections.

6. Any controller which falls out of "step" for any reason will be automatically put back "in step" within two cycles.

7. The existence of trouble at one or more local controllers will be indicated at the master control point by the flashing of a light signal on the master control panel.

8. It will be possible, from the master control point, to discontinue the operation of any or all sections of the system for any desired length of time.

9. It will be possible, from the master control, to initiate or discontinue the operation of illuminated traffic signs pertaining to regulations in effect during certain periods of the day, without interfering with the operation of the signal system.

10. It will be possible, from the master control point, to operate flashing amber on Broad Street, and flashing red on the side streets for the entire system or any section of it. This provision is intended to take care of the morning hours from 1:00 A.M. to 6:00 A.M.

Operating changes from the central control can be made manually or automatically by means of a master control clock which permits the setting-up of the complete program for one week's time. It is planned to adjust the system to favor the inbound traffic in the morning, and the outbound flow of traffic in the evening.

In general, there will be four signal posts at each intersection. These posts will be surmounted with two-face signals at right angles, thus giving every pedestrian an indication directly in front of him as he starts to cross in any direction.

Pedestrian Clearance Cycle

The pedestrian clearance cycle, already tried and proved in Pittsburgh, will be used in this system—and, indeed, will gradually become the standard system throughout Philadelphia.

The method to be employed is to bring on the amber light with the green "Go" light. The showing of this combination is a warning to the pedestrian that there is no longer time for him to cross the roadway. The green-amber interval, plus the short vehicle-clearance amber interval which follows, is of such a length as to permit a pedestrian to walk across the roadway .

Opportunity to Test Relative Merits of Simultaneous and Flexible Progressive Systems

If desired, the great flexibility of this system will permit the carrying-out of a most interesting practical research test. While nearly all traffic engineers strongly favor the flexible progressive system, no practical demonstration is known which, carried out as a strictly impartial research, has demonstrated the relative merits of this system and of the simultaneous system, although numerous simultaneous systems have been supplanted by flexible progressive systems, generally with improved results.

While it has not been definitely decided, consideration is being given to the making of such a research comparison test.

Appropriate comparative records of such factors as speeds, delays, cross-traffic conditions, pedestrian observance, accidents, and public reaction would be obtained.

A portion of the work of installation has been completed, and much of the equipment has already been delivered. It is hoped to put the system in operation late this summer.

Through Streets in Pittsburgh

ACCORDING to the figures exhibited by Lewis W. McIntyre, Traffic Engineer for Pittsburgh, accidents have been effectively reduced on six "Through Stop" streets. The records were divided into three periods of eight months each, the first before installation (1928), the second (1929) during the educational period when great publicity was given and a few signs were actually being erected, and the third period (1930) following the establishment of "Through Stop" streets.

Motor-vehicle accidents decreased steadily during the three periods, being 147, 129 and 103 respectively. The last period showed an accident decrease of 30 per cent between the first and third periods, and a decrease of 20 per cent between the second and third periods. On parallel thoroughfares, the figures represent a decrease of 33 per cent from 24 accidents in 1928, and 24 in 1929 to 16 in 1930. On individual streets the number of accidents during 1930 dropped as much as 64 per cent below the 1928 experience, and as much as 21 per cent below the record for 1929.

Pedestrian accidents increased from 10 in 1928 to 27 in 1929, and dropped to 13 in 1930. On four of the through streets, two showed an increase and two a decrease. However, on each of the four streets the number of accidents did not exceed two in any year, so that the increase or decrease was numerically slight. On the other two streets there was an increase during 1929 over 1928, and in each case a decrease in 1930. In one instance, the 1929 increase was caused principally by a large number of pedestrian accidents between intersections.

The active cooperation of the Police Bureau in enforcing the regulation has without doubt been principally responsible for the accident reduction. It is indicated that there should be a further reduction in accidents with the continuation of the enforcement program, as it has been found that obedience to the regulation is increasing.

In extending the through street principle, Pittsburgh is really erecting "Stop and Go" signals rather than signs guarding its "Through Traffic" streets. The signals have a flashing red light which illuminates the word "Stop." Vehicles are required to stop at the light and are permitted to go when safe. This type of sign is somewhat of a "Stop and Go" signal which eliminates the wait for a green light, so often necessary with the fixed cycle timer. Traffic is therefore expedited. For the same expenditure, more intersections may be protected than with the ordinary "Stop and Go" light.

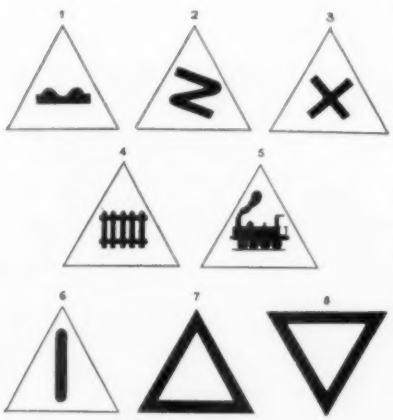
European Conference on Road Traffic

UNDER the auspices of the League of Nations, certain members of the League held a conference at Geneva for the purpose of arriving at a standard system of road signs March 15 to 30, this year. As a result of this conference, eleven members of the League signed the Convention Concerning the Unification of Road Signals. Among the signatories were Belgium, Germany, France, Italy and Switzerland, the countries which represent the largest amount

of motor traffic in Continental Europe. Since England is not a signatory, the Conference could really be called the Continental European Conference on Road Traffic, although other members and also non-members may sign the Convention before September 30, 1931.

In consideration of the geographical and language difficulties and discrepancies of Continental Europe, the Conference has entirely avoided the use of words on signs and in their place has used symbols. While to the average American motorist this may appear a cumbersome new language, particularly in the adopted combination of symbols and colors, from the European point of view a system like our standard code of road signs and markers would have been impossible. They have substituted for a necessary multiplicity of inscriptions—according to the language of the country in which the signs would be erected—an international language of symbols. Such a system will to a great extent avoid the enormous number of variations from which our system is suffering.

Triangular Signs



The triangle has been adopted as general danger sign (1-5). Wherever the hazard is not given by symbol, a vertical car is shown (6). Provision has been made to apply this sign to climatic and atmospheric conditions (snow, ice, wind) by allowing an outline of the triangle instead of the full sign (7). An inverted triangle (8) is used as right-of-way sign, the equivalent of our "Stop" sign used on through streets (8).

Circular Signs

Circular signs are used to signify definite instructions—entirely or partly restrictive. They are used for restriction of all traffic (1, 2) or restriction of certain vehicles, depending upon type or weight (3, 4, 5, 6, 7). They are also used as speed limit signs (8) or "No Parking" signs (10). The "No Waiting" sign (9) is evidently for the purpose of eliminating even temporary stoppage of cars.

The "One Way" sign (11) and the "Customs House" sign (12)—the latter

NOTE.—Red is indcated above by dots, and blue by vertical lines. (These colors are not compulsory.)

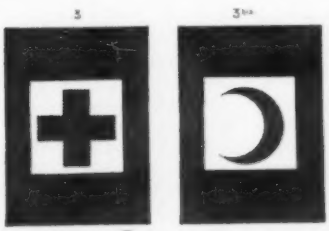
very important for European conditions, are also circular signs.

Rectangular Signs

The rectangular sign is used for "Parking" (permitted) (1), and as general "Caution" sign (2).

A triangle-danger-symbol appear in the Caution sign.

With an eye upon accidents, a special sign showing a red cross or red crescent (the equivalent of the red cross in Mohammedan countries) has been adopted.



Directional signs are oblong or pointed strips with the name and distance thereupon.

Colors

It is rather interesting that no attempt has been made to standardize the size of the various signs or the symbols thereupon. The color scheme of four colors (white, black, red, blue) of which on some signs three are used, is not very practical. The combination and a possible variation of shades of red and blue are not an asset to this system, since day and night visibility is of such importance.

It is rather unfortunate that there is no affinity whatsoever between the European and the American system. No doubt, more and more American motorists will visit Europe, and vice versa, and in both cases the lack of ready understanding of the sign system may cause considerable hardship.

Annual Meeting Plans

PLANS for the Annual Meeting of the Institute of Traffic Engineers to be held at the Stevens Hotel in Chicago, October 15, 1931, are progressing satisfactorily, according to the Board of Direction. The program tentatively decided upon consists of four sessions:

Morning Session

Reports of technical committees
Presentation and discussion of members' thesis

Luncheon Session

Business meeting

Afternoon Session

Traffic signal manufacturers "free-for-all," at which the outstanding features of the traffic equipment of eight signal manufacturers will be presented

Annual Dinner

The speaker for this meeting will be announced later.

Members Elected to Institute

THE Board of Direction of the Institute met in New York, June 1, and approved membership applications of the following:

Members

Henry M. Brinckerhoff, Consulting Engineer, 142 Maiden Lane, New York.
E. B. Lefferts, Manager, Safety Department, Automobile Club of Southern California, Los Angeles, Calif.
L. E. Peabody, Senior Highway Economist, United States Bureau of Public Roads, Washington, D. C.
J. G. Regan, Traffic Control Specialist, General Electric Company, Schenectady, N. Y.

Associate Members

Benoit Laberge, Traffic Engineer, Office of Director of Public Works, Montreal, Que.
Theodore T. McCrosky, Planning Director, City Planning Commission, Yonkers, N. Y.
Graeme Reid, Traffic Engineer, Public Service Coordinated Transport, Newark, N. J.

In addition, an invitation was extended to George W. Elliott, General Secretary, Philadelphia Chamber of Commerce, to become an Affiliate Member.

The Institute now numbers 59 members in the following classes:

Member	36
Affiliate Member	9
Associate Member	14

Since the meeting of the Board, applications for membership have been received from:

Clarence B. Bishop, Assistant Highway Transport Engineer, U. S. Bureau of Public Roads, Washington, D. C.

J. Robert Guthrie, City Planning Commission, Columbus, Ohio.

K. W. Mackall, Crouse-Hinds Co., Syracuse, N. Y.

Water Rates and Regulations

Part III

Water-Meter Rates

Hydrant Rentals and Sprinkler Charges

Regulations Covering Taps and the Installation of Service

(Continued from the June issue)

Greenwich, Conn.

The Greenwich Water Co., a subsidiary of the Community Water Service Corporation, serves Greenwich, Sound Beach, Riverside, Cos Cob, East Port Chester and Glenville. The system is 100 per cent metered and the following rates apply:

Cubic Feet per Quarter		Per 100 Cubic Feet
First 700	$3.60 minimum	
Next 3,300		30c
" 6,800		22c
" 80,200		16c
Over 100,000	By special contract	

For fire hydrants, both municipal and private, the company charges $50 each per year. Fire hydrants are installed and maintained by the company, except in cases of installations on private estates, in which case the service must be metered and the complete cost of installation borne by the consumer. Maintenance in all cases is by the company.

SPRINKLER SYSTEMS

4" service $50.00 per year plus 5c per sprinkler head
6" service $75.00 per year plus 5c per sprinkler head

The complete cost of installation of sprinkler system must be borne by the consumer.

All street connections or service taps are installed by the company from main to curb or property line. The consumer furnishes the trench and makes a contribution toward the cost of materials and installation. Maintenance or replacement of regulation service taps or street connections from the main to the curb is done by the company.

Hartford, Conn.—164,072

The Water Bureau, Metropolitan District Commission, Hartford, Conn., makes the following charges for water:

Cubic Feet per Day	Per 100 Cubic Feet
First 3,000	15c
Over 3,000	7½c

MINIMUM CHARGES

Size of Meter	Per Year
⅝"	$6.00
¾"	7.50
1"	10.50
1½"	18.00
1½"	30.00
2"	60.00
3"	90.00
4"	180.00
6"	

These charges include that for water used at the established rate up to the amount of the minimum charge.

Water bills are rendered and become due semi-annually, except in the case of meters 2 inches and larger, for which water bills are rendered monthly. Five per cent will be added to all water bills remaining unpaid 20 days after due, and an additional 1 per cent will be added on the first day of each month thereafter until paid.

Hydrants are installed on order of the Fire Department. There is a flat installation charge of $175.00 per hydrant and an annual maintenance charge of $5.00 per hydrant. The maintenance charge on private hydrants is either $7.50 or $10.00 per year, depending on the location of the hydrant.

Service pipes are installed by the Department from the main to the street line only. New service pipes and the renewal of old service pipes require the same procedure and take the same charges, which are as follows:

Size of Pipe	In Improved Pavement	In Other Locations
1"	$75.00	$45.00
1½"	90.00	60.00
2"	105.00	75.00
4"	280.00	250.00
6"	360.00	330.00

No service pipe may be connected with the city distribution system unless it is of genuine wrought iron, galvanized or other approved pipe, not less than 1 inch and not more than 2 inches in diameter. Pipes langer than 2-inch shall be of Class "C" cast iron pipe, American Water Works Association standard, unless otherwise approved by the Water Bureau. All pipes must be laid to a depth to have at least 4½ feet cover and, so far as practical, must be laid in a straight line from the curb cock to the inside of the building wall. The property owner must equip all service pipes with a suitable valve or stop and waste cock just inside the building wall.

The installation charges for fire services are the same as for domestic services. They are unmetered and there is no other charge connected with them, but they may be used only in case of fire.

Plainville, Conn.—6,301

The Plainville Water Company charges the following rates:

Cubic Feet per Quarter	Per 100 Cubic Feet	Total Bill
First 10,000	32c	$32.00
Next 10,000	27c	59.00
" 10,000	20c	79.00
Over 30,000	15c	

The minimum charge of $4.00 per quarter provides an allowance of 1,250 cubic feet. The annual meter rental charge on all meters larger than ⅝-inch is billed at 10 per cent of the cost of the meter. There is no rental charge on ⅝-inch meters.

Hydrant rentals, both public and private, are $35.00 per year. Sprinklers are billed at 10 cents per connection per year.

The customer lays and owns the service pipe, which must be of galvanized iron. The tapping charge, including the gooseneck, is $6.00.

South Manchester, Conn.

The South Manchester Water Co. uses the following scale of water charges:

Cubic Feet per Quarter	Per 100 Cubic Feet
First 10,000	25c
Next 40,000	17½c
Over 50,000	10c

These rates are subject to minimum charges for each service connection and a ⅝-inch meter in domestic and commercial consumption of $2.50 per year for the first service and $1.25 per year for each additional family, store, office or similar service. Services requiring larger connections and meters are charged at proportionately higher rates.

Public fire service is billed at 1 cent per inch-foot of pipe yearly, and public hydrants at $10.00 per year each.

The private fire protection service rates, including all water used for fire purposes, are as follows:

	Per Year
Each hydrant	$5.00
Each ¾" standpipe	1.00
" 1" "	1.50
" 1¼" "	2.00
" 1½" "	2.50
" 2" "	3.50
" 2½" "	5.00
" ½" automatic sprinkler	0.05

These rates are applicable only on such connections as are made entirely at the expense of the property owner, including also the cost of tapping the main.

The service connection from the street main to the street curb will be furnished and maintained by and at the expense of the water company. One suitable meter will be furnished, set and maintained by and at the expense of the company for each separate service connection.

Stamford, Conn.—46,346

The Stamford Water Co. charges for metered water according to the following schedule:

Cubic Feet per Quarter	Per 1,000 Cubic Feet
1,200	Minimum
13,800	$3.60
30,000	2.40
60,000	1.80
105,000	1.00

MINIMUM CHARGES
(including 1,200 cubic feet of water)

Size of Meter	Per Quarter
⅝"	$4.50
¾"	7.00
1"	10.00
1¼"	15.00
1½"	20.00
2"	30.00
3"	50.00
4"	80.00
6"	

The following charges are made for supplying sprinkler systems, connections for standpipes or other devices connected with mains by a direct line used only for fire purposes:

Size	Per Year
1"	$5.00
1½"	10.00
2"	20.00
3"	30.00
4"	50.00
6"	75.00
8"	100.00

For each public fire hydrant, the city is charged at the rate of $20.00 per year. Hydrants are owned, installed and maintained by the city.

The consumer is required to install, maintain and pay for service lines and fittings, all stops and necessary fittings to be purchased from the company. The company will furnish and set meters and connections free of charge, the meter and connections to remain the property of the company.

All sprinkler or private service lines must be metered, the meter to be furnished, set and maintained by the consumer.

Meter bills are rendered quarterly. If not paid within ten days after they become due, the water may be shut off after due notice.

Lakeland, Fla.—18,554

The minimum charge for water made by the Light and Water Department of Lakeland, Fla., is $1.00 per month, the water rates being as follows:

Gallons per Month		
First	3,000	$1.00 minimum
		Per 1,000 Gallons
3,000 to	75,000	18c
75,000 to	100,000	15c
Over	100,000	12c

Sprinkler systems are installed at actual cost and no charge is made for service. The fire hydrant rental is $45.00 per year.

TAPPING CHARGES

Size	
¾"	$10.00
1"	15.00
1½"	25.00
2"	50.00

No charge is made for ¾- and 1-inch meters, while for 1½- and 2-inch meters, consumers are billed at cost less $22.00.

Orlando, Fla.—27,330

The water schedule of the Orlando Utilities Commission, is as follows:

Gallons per Month		Per 1,000 Gallons
First	10,000	25c
Next	40,000	20c
"	50,000	15c
Over	100,000	10c

The minimum charge of $1.00 per month is the same regardless of the size of meter installed. The Commission owns and installs all meters, which are set in the parkway or sidewalk.

A charge of $25.00 per year is made to the city for each hydrant, regardless of the size of the main. The same charge is made for private fire service or sprinkler systems, regardless of the number of sprinkler heads. The cost of laying the fire service from the main to the outside of the building is paid for by the owner. No meters are put on such lines.

Services will be completed to the curb when the application is accompanied by the following tapping fees:

Size of Service	
¾"	$9.00
1"	12.00
1¼"	15.00
1½"	18.00
2"	21.00

On all services over 2 inches an estimate will be made covering the cost of the service, this cost to be based upon the actual time and material necessary to make the tap. These tapping fees cover the service line from the main to the meter and the installation of the meter and meter box.

La Grange, Ga.—20,131

METER RATES

Gallons per Month		Per 1,000 Gallons
First	20,000	30c
Next	80,000	20c
"	100,000	15c
Over	200,000	10c

Minimum charges, $1.00 per month.

The charge for private fire service made by the city includes a rate of 6 cents per sprinkler head per year and $35 per year for each hydrant. When a fire meter is installed, the owner pays the entire cost of the meter, housing, labor and all materials required in making the connection, and the consumer is charged on a basis of water consumed under the regular schedule of meter rates with a minimum charge of $50 per year.

TAPPING

Size of Taps	Charge
⅝", ¾" and 1"	$25.00
1¼" and 1½"	50.00
2"	75.00

All taps larger than 2 inches are made at the expense of the owner.

Macon, Ga.—53,829

WATER METER RATES

Gallons per Day	Per 1,000 Gallons
Less than 3,000	20c
3,000 to 6,000	
6,000 to 10,000	18c
10,000 to 15,000	15c
15,000 to 20,000	12c
Gallons per Month	Per 1,000 Gallons
600,000 to 3,000,000	11c
3,000,000 to 4,000,000	10c
4,000,000 to 6,000,000	8c
6,000,000 and over	6c

A charge of $3 is made for changing a meter from one location to another and for setting a meter for building purposes. A minimum of 60 cents per month is charged within the city limits and $1 per month outside the city.

The following prices are charged for meters:

⅝" meter—$15.00 cash; $16.50 on time, $3.00 cash down and $1.30 per month until paid
¾" meter and tap, combined, $18.00.
¾" meter—$25.00 cash; $27.00 on time, $7.00 down and $2.00 per month.
1" meter—$41.00 cash.

Prices for meters larger than 1 inch will be furnished by the Board of Water Commissioners on request.

The city has entirely eliminated fire service charges, with the exception of private fire hydrants, on which the annual charge has been reduced from $30 to $15. For fire service connections, the city charges the actual cost of material and labor, plus 15 per cent overhead.

TAPPING CHARGES

⅝" tap and ¾" curb cock	$7.00
1" tap and 1" curb cock	9.00
1¼" tap and 1¼" curb cock	17.50
1½" tap and 1½" curb cock	27.50
2" tap and 2" curb cock	40.00

Thomasville, Ga.—11,733

All water service in this city is metered. The City Water and Light Department makes a charge of 20 cents per 1,000 gallons for the first 40,000 gallons of water used, and 12 cents per 1,000 gallons for all additional. A discount of 10 per cent is allowed for cash, the minimum charge being $1.11 per month.

No revenue is derived from hydrant rentals. A nominal figure of $40 per year is named in the report of the Department, but this is not considered in its earnings account. There are no sprinkler charges.

The city makes all taps, installs the meter at the curb and runs the service pipe to the property lines for the following charges:

Size of Service	Charge
1½"	$10.00
¾"	15.00
1"	20.00

On services over 1 inch the price is estimated by the Superintendent.

Correction

IT has been called to our attention that the population of Corona, Calif., was given in our June issue as 4,129, the 1920 figure. The 1930 population is 7,018, a 70 per cent increase over that of 1920:

(To be continued in the August issue)

MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

Educational Buildings

The American School and University, 1931-1932. —*American School Publishing Corporation, 470 Fourth Avenue, New York. 563 pp. $5.00, with a 50 per cent discount to school officials.*

The fourth annual edition of this yearbook devoted to " the design, construction, equipment, utilization, and maintenance of educational buildings and grounds" is now available. It contains articles on a wide variety of subjects, and valuable reference material, including up-to-date directories of college and university presidents, state boards of education, superintendents of schools in all places of 5,000 and over, and architects and landscape architects in the school field. Edwin C. Broome, Superintendent of Schools in Philadelphia, and President of the Department of Superintendence of the National Education Association, states in the Foreword that "no other publication comprises between two covers such an abundance of useful material on the subject of school buildings and equipment."

"Education today," he writes, "must be all-inclusive, and must be so planned that it serves the needs of all types in the community." Because so many types of education are offered today to meet the varied needs of the population, it is difficult for school executives and board members to keep informed of what other communities are doing. The American School and University therefore has assembled information about recently constructed buildings for elementary schools, high schools, commercial schools, vocational schools, consolidated schools, country day schools, boarding schools, junior colleges, colleges and universities. Attention is given to the financing, planning, construction, furnishing, lighting, heating, ventilating and modernizing of educational buildings and the planning and lighting of school grounds. Radio, talking pictures, playgrounds, cafeterias and laundries are also taken up.

Government Costs

Cost of Government in the United States, 1928-1929.—*National Industrial Conference Board, Inc., New York.* 1931. 174 *pp.* $3.00.

This is the eighth annual volume of studies in regard to the cost of government, national, state and local, by the research staff of the Board, supplemented by the experience and opinion of the business men making up the Board membership. Expenditures, indebtedness, and tax revenue and its sources are separately treated, and there is a special chapter on highway finance. The appendix includes a gasoline-tax table showing rates and use of proceeds.

Road Builders

The Summary Proceedings of the Twenty-eighth Annual Convention of the American Road Builders' Association, held in St. Louis, Mo., January 10-17, 1931, are published in a 541-page leather-bound volume. Containing a subject index but unfortunately lacking a table of contents or list of section heads, the Proceedings include illustrated papers and reports on subjects relating to county legislation, finance and administration; city administration, organization and finance; highway finance and administration; highway location; grade crossings and highway intersections; construction and maintenance methods for low-cost roads and bridges; subgrades and pavement bases; equipment; central and truck mixed concrete; airport drainage and surfacing; motor freight, etc. $5.00. (Apply to the Association, National Press Bldg., Washington, D. C.)

Annual Report

The Annual Report of the city of Lynchburg, Va., a city manager city, is a well-presented itemized summary of the work of the city departments for the fiscal year ending December 31, 1930. It is illustrated with photographs, charts and diagrams. 127 quarto pp. (Apply to R. W. B. Hart, City Manager, Lynchburg, Va.)

Zoning

Zoning in the United States.—Vol. 155, Part II, The Annals of the American Academy of Political and Social Science. Edited by W. L. Pollard, May, 1931. 230 *pp. Clothbound.* $1 *from* THE AMERICAN CITY.

Practically every phase of zoning is covered in the 26 articles comprising this volume, which is presented in four parts: "Historical and Legal Aspects," "Procedure," "Economics and Zoning," and "General." Part II is particularly comprehensive. Its eight articles are: "Zoning Surveys and Procedure," by Earl O. Mills; "Standardization of Zoning," by A. E. Williamson; "Zoning by Design," by Charles H. Diggs; "State Zoning," by C. B. Whitnall; "Business Zoning," by Harland Bartholomew; "Open Spaces for Residential Buildings," by Robert Whitten; "Mechanics of Zoning Adjustments," by C. J. S. Williamson; and "Regulating Land Uses in the County," by L. Deming Tilton. Every part contains discussions important alike to the professional and the lay citizen concerned with the problems of their own community's development. The editorial advisory group for the volume was composed of Gordon Whitnall, Donald Baker, Charles Diggs, A. E. Williamson, and C. J. S. Williamson. Many other outstanding figures in the movement are represented among the 26 authors. There is a section of Selected References on Zoning by Katherine McNamara, with a large number of citations to AMERICAN CITY material. The whole is the most comprehensive volume yet to appear on the subject.

A Carbon Monoxide Fire

A fire caused by an overheated furnace in the airtight basement of a store built on a river bridge in Rochester, N. Y., made little property damage but resulted in 38 firemen being taken to hospitals, and some 40 others requiring treatment at the scene of the fire. The firemen suffered from carbon monoxide and a deficiency of oxygen, according to a report of D. A. Dailey, Commissioner of Public Safety, available in 4-page mimeographed form. The case is of special interest as indicating inadequate protection from ordinary gas masks under such conditions. (Apply to Mine Safety Apparatus Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.)

Health and Hospitals

The American Public Health Association and the Kansas City Public Service Institute have collaborated in a report on Health and Hospitals in Kansas City which is announced as one of the most interesting and valuable local studies in which the A.P.H.A. has assisted. The report is based on a survey made by the Chamber of Commerce at a cost of over $15,000, and an administrative study of hospitals. 329 pp. $2. (Apply to Civic Dept., Chamber of Commerce, Kansas City, Mo.)

Sewage Works Association

The Proceedings of the Sixteenth Annual Meeting of the New Jersey Sewage Works Association, held at Trenton, N. J., March 20-21, 1931, includes, besides committee reports and resolutions passed, papers describing various sewage disposal plants, the activated sludge process, and other phases of sewage treatment and purification. 83 pp. (Apply to John R. Downes, Secretary, Bound Brook, N. J.)

Street Paving

"Street Paving in Representative American Cities, 1925-1929" is the subject of Information Circular 6431 of the U. S. Department of Commerce's Bureau of Mines. The report was prepared by Arthur H. Redfield, associate economic analyst of the petroleum economics division, and is based on statistics compiled by the Bureau in connection with the asphalt chapter of Mineral Resources of the United States, covering street pavement laid in 201 representative cities during the five-year period. 30 mimeographed pp. (Apply to the Bureau of Mines, Dept. of Commerce, Washington, D. C.)

Local Government

The Development of Local Government.—By William A. Robeson. George, Allen and Unwin, London. 1931. 362 *pp.* 12*s.* 6*d. net.*

Dr. Robeson presents this work with the conviction that there is a very great need at the present time for a serious re-examination of the problems in the field of local government; that "the municipal system is being subjected to a serious and perhaps dangerous strain by reason of the fact that burdens are being placed on the structure greater than those which it was designed to bear," and that "an adjustment between structure and function is urgently called for." The large masses of new and significant data which he examines pertain chiefly to situations in Great Britain, but the facts and tendencies analyzed and the conclusions presented will prove valuable and suggestive material for all seekers after sounder and more satisfactory local administration—local administration which represents a new high level of civic self-consciousness. The municipal structure, the functions of local authorities, municipal civil service, public health administration, and the esthetic activities of local councils are among the topics presented.

Industrial and Commercial Survey

"Suggestions for Outline of a City Survey (Industrial and Commercial)," by A. L. Bush, Chief of the Special Inquiry Section of the Domestic Commerce Division of the U. S. Department of Commerce, has just been published by the Department as Domestic Commerce Publication No. 45. The pamphlet was prepared for convenience in answering the requests of individuals interested in preparing an industrial or commercial survey. 16 pp. 5c. (Apply to the Superintendent of Documents, Washington, D. C.)

Law Enforcement Officers

The 1931-32 "Official Guide and Directory and Bulletin" compiled by the Sheriffs and Police Officers' Association of America is now available. It contains "a classified directory of all sheriffs in the United States; all chiefs of police in cities and villages of 3,000 and over; United States Marshals, special agents of Department of Justice, United States district attorneys, wardens and superintendents of state penal institutions; and a roster of the membership of the Association." 308 pp. (Apply to the Association, 188 W. Randolph St., Chicago, Ill.)

Civic Pittsburgh

This 32-page booklet is the 1930 edition of a series prepared annually by J. C. Slippy, for over ten years Chief Accountant in the office of the Mayor of Pittsburgh, Pa. It briefly describes the organization and administration of the city, analyzes its income, expenditures and indebtedness, and does similarly for the county of Allegheny. 50c. (Apply to the author.)

Governmental Relationships

In the summer of 1930 the University of Minnesota sponsored a Conference on Governmental Relationships, between state, county and municipal units, this being the outgrowth of a conference on community relationships held in the 1929 summer session, and concerned chiefly with problems of the small city and town. The 1930 conference dealt chiefly with the fields of law enforcement, public utilities, taxation and finance, and public health, and raised the questions, as to these, of the proper division of powers between the kinds of government, and of the proper administrative units or areas. Several guest speakers from outside the state participated. The conference is reported, in part, in a cloth-bound volume of 138 pages, constituting No. 24 of Vol. XXXIV of the *Bulletin* of the University, dated March 31, 1931. (Apply to Morris B. Lambie, Chief, Municipal Reference Bureau, University of Minnesota, Minneapolis, Minn.)

Asphalt Paving

The addresses, papers and discussions which occupied the sessions of the Ninth Annual Asphalt Paving Conference, held in Memphis, Tenn., December 1-5, 1930, are published in one volume by The Asphalt Institute. Among the subjects taken up at the Conference, which was held under the auspices of the Institute and the Association of Asphalt Paving Technologists, were airport surfacing, low-cost roads, stage construction, resurfacing, foundations, pavement widening, and maintenance. 313 pp., illustrated. (Apply to the Institute, 801 Second Ave., New York.)

Housing and Town Planning

The 1929 and 1930 Report of the Pennsylvania Housing and Town Planning Association is published in a 25-page pamphlet. Brief sections are devoted to state responsibility in housing, building codes and ordinances, local authority over housing, city planning commissions, regional planning, zoning, housing needs, etc. (Apply to the Association, Room 803, Allman Bldg., 17th and Walnut Sts., Philadelphia, Pa.)

Municipal Year Book, Canada

The 6th annual edition (1931) of the "Municipal Year Book for Canada," formerly the "Canadian Municipal Directory," contains (1) an official municipal gazetteer of Canadian cities and towns and a directory of municipal officials; (2) reference data and statistics of principal municipal departments, such as Waste Disposal, Power Plant, Park, Sewage, Water Works, Roads, etc.; and (3) official buyers' guide for municipalities and contractors. 203 pp. $5.00 leather bound; $2.50 paper bound. (Apply to Wisely Bragg Publishing Co., Ltd., Montreal, Que.)

City Plan, Oklahoma City

The city plan for Oklahoma City, Okla., prepared by Hare & Hare, city planning consultants, and approved by the City Planning Commission, is published in an illustrated report of 84 quarto pages. Sections are devoted to a description of controlling conditions; recommendations; procedure; and an appendix containing subdivision rules, presented and proposed zoning ordinances, etc. (Apply to Hare & Hare, 712 Huntzinger Bldg., Kansas City, Mo.)

Public Health Program

At the request of the Health Officer and the Board of Health of San Francisco, Calif., a representative of the Committee on Administrative Practice of the American Public Health Association made an analysis of the public health activities in that city in 1929-1930, which has been published under the title of "An Appraisal of the Public Health Program, San Francisco, California, for the fiscal year 1929-1930." The study was conducted by Dr. Ira V. Hiscock of the Department of Public Health of the Yale School of Medicine, with the cooperation of local official and voluntary organizations. 155 pp. (Apply to the Board of Health, San Francisco, Calif.)

Detroit Hospital

Because of the charges of a local tabloid newspaper attacking the operation of the Herman Kiefer Hospital, Detroit, Mich., and the administration of the local Health Department under Dr. Vaughan, the Detroit Bureau of Governmental Research, at the request of the Commissioner of Health, made a study of the situation. This has been published as Report No. 122, "The Herman Kiefer Hospital of Detroit." The report takes up the charges and makes recommendations "for the betterment of the present excellent service." 56 mimeographed pp. (Apply to the Bureau, Detroit, Mich.)

Local Government

"The Question of Municipal Organization" is the title of an appraisal of the city manager and other types of municipal government from the standpoint of business organization, by the Division of Municipal and Industrial Research, Massachusetts Institute of Technology. "Any discussion of American local government must recognize the challenge which the council-manager form now offers to all other types of municipal organization. 8 pp. 10c. (Apply to the Division, Cambridge, Mass.)

Political Science

New Aspects of Politics.—By Charles E. Merriam. Second edition. University of Chicago Press. 253 *pp.* $3.00.

Since the essays of Professor Merriam on the relations of history, psychology and statistics to politics were published in 1925, there has been a marked interpenetration of the social sciences and an increased attention to method and measurement. Encouraged by these tendencies, Professor Merriam, who as a political scientist has had a leading role in calling the attention of his fellow workers in that vineyard to the ripening fruits of neighboring studies, now offers a second edition of his essays.

Zoning Ordinance

The zoning ordinance of the village of Scotia, N. Y., prepared with the aid of R. H. Randall & Co., as consultants, and adopted April 27, 1931, is available in the form of a 19-page printed pamphlet, including a zoning map. (Apply to Village Clerk, Village Hall.)

City Manager Plan

The Citizens League of Cleveland, in its bulletin, *Greater Cleveland*, issue of June 4, reviews that city's experience with the manager plan during the past two years, in a survey which supplements its five-year survey made over two years ago, and with it constitutes a seven-year record under two managers. The new bulletin has 12 pages. (Apply to The Citizens League, 1307 Swetland Bldg., Cleveland, Ohio.)

House Numbering

"House Number Signs" is the title of a 20-page pamphlet by Joseph W. Nicholson, City Purchasing Agent of Milwaukee. The need of an efficient system, the assignment of numbers, and the selection and location of number signs are discussed, and the Milwaukee system is fully presented, with details of the purchase of signs. The tests for visibility and color, size and design, and durability are given, as are costs. Illustrated. 25c. (Apply to Municipal Administration Service, 261 Broadway, New York.)

Subway Construction

Standards No. 1. Specifications for Structural Design and Track Work, State Street Subway—Route No. 1. August 1, 1930. 18 pp. By Advisory Subway Engineering Commission, Committee on Local Transportation, City of Chicago. (Copies may be obtained from R. F. Kelker, Jr., Chief Engineer, Bureau of Subways, Room 2620, 20 N. Wacker Drive, Chicago, Ill.)

Architectural Control

"Considering the Street Picture: A Responsibility Too Long Neglected by Architects and Civic Improvement Bodies," an article by Harry B. Brainerd, A.I.A., in THE AMERICAN CITY, March, 1931, page 114, is printed in pamphlet form in the Research Studies series of the East Side Chamber of Commerce, New York. 4 pp. (Apply to East Side Chamber of Commerce, 120 Bowery, New York.)

Building Code

The 1931 or Fifth Edition of the "Building Code Recommended by the National Board of Fire Underwriters," is "an ordinance providing for fire limits, and regulations governing the construction, alteration, equipment, repair, or removal of buildings or structures." The last edition has, it is stated, been completely revised to meet new developments in building construction. 316 pp. Free. (Apply to the Board, 85 John St., New York; 222 W. Adams St., Chicago, Ill.; or 1014 Merchants Exchange Bldg., San Fracisco, Calif.)

Unemployment

The Research Bureau of the Welfare Council of New York City has published "Unemployment in New York City—An Estimate of the Number Unemployed in December, 1930, and the Sources of Information on the Extent of Unemployment in New York City," by Edna Lonigan, formerly chief statistician of the New York State Department of Labor, "to bring together for the benefit of the social agencies within the Council, and its Coordinating Committee, all of the data which could throw light on the volume of employment and unemployment" in the city during the winter. 56 pp. (Apply to the Council, 151 Fifth Ave., New York.)

Street Sanitation Records

"Manual of Street Sanitation Records for Cities of 10,000 to 50,000 population, as installed in Brunswick, Georgia," is the first of a series of five manuals being prepared by the Committee on Uniform Street Sanitation Records of the International Association of Public Works Officials to illustrate how the proposals of the Committee can be put into effect in cities of various sizes. The city of Brunswick was used for demonstration purposes, and the report shows how the proposed system of measurements and records for street cleaning, catch-basin cleaning, refuse removal and disposal may be installed in small cities. 55 pp., plus various forms. (Apply to the Committee, 923 E. 60th St., Chicago, Ill.)

Golf

There are now 290 municipal golf courses in the United States, according to the 1931 publication of the Public Links Section, United States Golf Association. This annual statistical study, as usual, gives details for the courses listed. 32 pp. (Apply to the Association, 110 E. 42d St., New York.)

Swimming Pools

"Planning the Outdoor Swimming Pool," a 40-page booklet by Lindon J. Murphy, is designed to aid civic leaders who are sponsoring swimming pools, as well as designing engineers. The pool in general, its type, size, shape and location, its general design and construction, its special equipment and lighting, are discussed. Sanitation is taken up in detail, and a section is devoted to bathhouses. The whole is illustrated with photographs and plans. Single copies free; additional, 10c each. (Apply to Engineering Extension Service, Iowa State College, Ames, Iowa.)

Traffic

Report No. 7 of the Philadelphia Traffic Survey is a study of South Philadelphia. Following a section devoted to the traffic characteristics of the section surveyed are recommendations for traffic regulation and recommendations for a system of main traffic arteries. 24 large pp., illustrated. (Apply to Mitten Management, Mitten Bldg., Philadelphia.)

Other Reports Received

CHICAGO, ILL.—Financial Statement based upon Annual Report, Retirement Board, June, 1930. 4 pp. 2c from Municipal Reference Library, Chicago.

CHICAGO, ILL.—Annual Report, Fire Commissioner, 1929-1930. 156 pp. 10c from Municipal Reference Library.

CHICAGO, ILL.—Report on Examination, Commissioner of Lincoln Park. 64 pp. 3c from Municipal Reference Library.

CHICAGO, ILL.—Annual Report, Police Department, 1930. 68 pp. 10c from Municipal Reference Library.

CHICAGO, ILL.—Park Employees' Annuity and Benefit Fund: Annual Report of Retirement Board, June, 1930. 40 pp. 3c from Municipal Reference Library.

CINCINNATI, OHIO.—Report of Water Works Department, years 1927, 1928, 1929. 120 pp.

DENVER, COLO.—Annual Report, Zoning Board of Adjustment, City and County, 22 pp.

DETROIT, MICH.—Annual Report, Police Department, 1930. 32 pp.

EAST ST. LOUIS, ILL.—Industrial Survey by Chamber of Commerce, 24 pp.

HOUSTON, TEXAS.—Houston Port Book. Vol. 1, for 1931. 76 pp.

MILLERS FALLS, MASS.—Annual Report, Fire and Water District, to April 23, 1931. 24 pp.

NEW ORLEANS, LA.—Annual Report, Department of Public Property, 1930. 48 pp.

NEW YORK.—Report of Governor's Special Long Island Sanitary Commission, Nassau County. May, 1931. 84 pp.

PITTSBURGH, PA.—Annual Report, Chamber of Commerce. 1931. 44 pp.

ST. JOSEPH, MO.—Annual Budget, to June 30, 1932. 16 pp.

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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance, other than local.)

JULY 8-11.—TACOMA, WASH. (400)
American Society of Civil Engineers. Annual convention. Secretary, George T. Seabury, 33 West 39th Street, New York.

JULY 12-18.—STANFORD UNIVERSITY, CALIF. (125)
Western School for Commercial Secretaries. Annual session. Manager, Leonard E. Read, Chamber of Commerce Building, Seattle, Wash.

JULY 20-26.—LOS ANGELES, CALIF.
International Road Machinery Exposition. General Manager, E. G. Lenzer, P. O. Box 338, Watts Station, Alameda Boulevard at 131st Street, Los Angeles, Calif.

JULY 21-23.—PITTSBURGH, PA. (250)
Pennsylvania Chiefs of Police Association. Annual convention. Secretary, J. N. Tillard, Police Chief, Altoona, Pa.

JULY 27-29.—TROY, N. Y. (300)
New York State Association of Chiefs of Police. Annual convention. Secretary-Treasurer, James L. Hyatt, 14 Hurlbut Street, Albany, N. Y.

AUGUST 2-15.—EVANSTON, ILL.
National Institute for Commercial and Trade Organization Executives. Secretary, John N. Van der Vries, 607 First National Bank Building, Chicago, Ill.

AUGUST 6-8.—SAULT STE. MARIE, MICH. (150)
Michigan Association of Chiefs of Police. Annual convention. Secretary-Treasurer, Alfred Seymour, Chief of Police, Lansing, Mich.

AUGUST 11-15.—PHILADELPHIA, PA. (1,000)
United States Building and Loan League. Annual convention. Secretary, H. F. Cellarius, 12 East 12th Street, Cincinnati, Ohio.

AUGUST 18-20.—COUNCIL BLUFFS, IOWA.
League of Iowa Municipalities. Annual meeting. Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 19-21.—HALIFAX, N. S. (250)
Union of Nova Scotia Municipalities. Annual convention. Secretary, Arthur Roberts, Bridgewater, N. S.

AUGUST 25.—EDMUNDSTON, N. B. (50)
Union of New Brunswick Municipalities. Annual convention. Honorary Secretary-Treasurer, John B. McNair, Fredericton, N. B.

AUGUST 27-29.—YONKERS, N. Y. (200)
National Shade Tree Conference. Secretary-Treasurer, Dr. Rush P. Marshall, Yale University, New Haven, Conn.

SEPTEMBER 2-4.—TORONTO, ONT. (125)
Ontario Municipal Association. Annual meeting. Secretary-Treasurer, H. L. Brittain, 137 Wellington Street W., Toronto, Ont.

SEPTEMBER 8-11.—RICHMOND, VA. (400)
American Society of Sanitary Engineering. Annual meeting. Secretary, T. M. Dugan, 1308 Fremont Street, McKeesport, Pa.

SEPTEMBER 9-11.—PORT HURON, MICH. (350)
Michigan Municipal League. Annual meeting. Director, Harold D. Smith, University of Michigan, Ann Arbor, Mich.

SEPTEMBER 10-12.—MONTREAL, QUE. (200)
International Association of Dairy and Milk Inspectors. Annual meeting. Secretary-Treasurer, Dr. Paul B. Brooks, State Department of Health, Albany, N. Y.

SEPTEMBER 10-12.—VERNON, B. C. (100)
Union of Canadian Municipalities. Annual convention. Secretary, Samuel Baker, City Clerk, London, Ont.

SEPTEMBER 12-14.—MONTREAL, QUE. (45)
Conference of State Sanitary Engineers. Annual meeting. Secretary-Treasurer, R. E. Tarbett, U. S. Public Health Service, Washington, D. C.

SEPTEMBER 14-17.—MONTREAL, QUE. (800)
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

SEPTEMBER 15-18.—NEW WESTMINSTER, B. C. (300)
Union of British Columbia Municipalities. Annual convention. Secretary, A. W. Gray, P. O. Box 580, New Westminster, B. C.

SEPTEMBER 16-18.—HUNTINGTON, IND. (100)
Municipal League of Indiana. Annual convention. Executive Secretary, Frank G. Bates, Indiana University, Bloomington, Ind.

SEPTEMBER 17-18.—BUFFALO, N. Y. (50)
National Association of Legal Aid Organizations. Secretary-Treasurer, J. S. Bradway, 3660 University Avenue, Los Angeles, Calif.

SEPTEMBER 21-24.—KANSAS CITY, MO. (450)
Association of American Cemetery Superintendents. Annual convention. Secretary, William B. Jones, Superintendent of Highwood Cemetery, Pittsburgh, Pa.

SEPTEMBER 24-26.—NEW YORK. (150)
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

SEPTEMBER 26 - OCTOBER 2.—ATLANTIC CITY, N. J.
American Electric Railway Association. Golden Anniversary convention. General Secretary, Guy C. Hecker, 292 Madison Avenue, New York.

SEPTEMBER 28 - OCTOBER 1.—PHILADELPHIA, PA. (200)
American Association of Port Authorities. Annual convention. Secretary, Tiley S. McChesney, Whitney Bank Building, New Orleans, La.

SEPTEMBER 28 - OCTOBER 1.—SALT LAKE CITY, UTAH. (400)
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

SEPTEMBER 28, WEEK OF.—TORONTO, ONT. (350)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 224 Wakewa Avenue, South Bend, Ind.

SEPTEMBER 28-OCTOBER 1.—LOS ANGELES, CALIF.
The Public Ownership League of America. Annual conference. Secretary, Carl D. Thompson, National Office, 127 North Dearborn Street, Chicago, Ill.

SEPTEMBER 29-OCTOBER 2.—BOSTON, MASS.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

OCTOBER 5, WEEK OF.—BOSTON, MASS. (450)
Atlantic Deeper Waterways Association. Annual convention. Address the Association, Widener Building, Philadelphia, Pa.

OCTOBER 5-9.—TORONTO, ONT. (600)
National Recreation Association. Annual Recreation Congress. Secretary of the Recreation Congress Committee, Thomas E. Rivers, 315 Fourth Avenue, New York.

OCTOBER 7-9.—ST. PAUL, MINN. (700)
American Society of Civil Engineers. Fall meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

OCTOBER 7-10.—LOUISVILLE, KY. (250)
International City Managers' Association. Annual convention. Executive Secretary, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

OCTOBER 7-8.—LOWELL, MASS.
Massachusetts Federation of Planning Boards. Annual conference. Secretary, Loring H. Jacobs, 135 Benvenue Street, Wellesley, Mass.

OCTOBER 8-9.—CINCINNATI, OHIO.
American Water Works Association—Central States Section. Annual convention. Secretary, B. J. Lechner, Water Department, Erie, Pa.

OCTOBER 8-9.—CAMDEN, N. J. (500)
New Jersey State League of Municipalities. Annual convention. Executive Secretary, Sedley H. Phinney, 34 West State Street, Trenton, N. J.

OCTOBER 12-13.—MONTEREY, CALIF.
California Sewage Works Association. Annual convention. Secretary, Professor E. Reinke, Life Sciences Building, University of California, Berkeley, Calif.

OCTOBER 12-15.—ST. PETERSBURG, FLA. (400)
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

OCTOBER 12, WEEK OF.—CHICAGO, ILL. (7,000)
National Safety Council. Annual Congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 13-16.—PITTSBURGH, PA. (500)
Illuminating Engineering Society, Annual convention. General Secretary, E. H. Hobbie, 29 West 39th Street, New York.

OCTOBER 14-17.—HAVANA, CUBA. (1,200)
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Fire Chief, Yonkers, N. Y.

OCTOBER 14-15.—FREMONT, NEBR.
League of Nebraska Municipalities. Annual convention. Secretary-Treasurer, C. E. Beals, Crete, Nebr.

OCTOBER 15.—CHICAGO, ILL.
Institute of Traffic Engineers. Annual meeting. Secretary-Treasurer, Hawley S. Simpson, 292 Madison Avenue, New York.

OCTOBER 18-21.—TOLEDO, OHIO. (325)
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, Gerrish Gassaway, Chamber of Commerce, Wilmington, Del.

OCTOBER 19-23.—PITTSBURGH, PA. (200)
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

OCTOBER 19-22.—NEW ORLEANS, LA. (300)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 21-23.—DENVER, COLO. (100)
American Water Works Association—Rocky Mountain Section. Annual meeting. Secretary-Treasurer, Dana E. Kepner, 226 Continental Oil Building, Denver, Colo.

OCTOBER 27-30.—JACKSONVILLE, FLA.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

OCTOBER 29-31.—LAWRENCE, KANS. (150)
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City, Iowa.

OCTOBER 30.—ST. PAUL, MINN. (40)
American Water Works Association—Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, 240 South Fourth Street, Minneapolis, Minn.

OCTOBER 30-31.—VANCOUVER, WASH., AND PORTLAND, ORE.
Washington Association of Commercial Organization Secretaries. Annual meeting. Manager, Thomas B. Hill, Chamber of Commerce, Seattle, Wash.

NOVEMBER 2-4.—GREENSBORO, N. C. (300)
American Water Works Association—North Carolina Section. North Carolina Sewage Works Association. Joint annual meeting. Secretary, H. G. Baity, School of Engineering, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 9-11.—BUFFALO, N. Y.
Governmental Research Association. Annual meeting. Secretary-Treasurer, Russell Forbes, 261 Broadway, New York.

NOVEMBER 9-11.—BUFFALO, N. Y.
National Municipal League. Annual convention. Secretary, Russell Forbes, 261 Broadway, New York.

NOVEMBER 9-14.—HOUSTON, TEXAS.
Texas Public Health Association. Ninth Texas Sanitarians' Short School. Secretary, E. G. Eggert, State Board of Health, Austin, Texas.

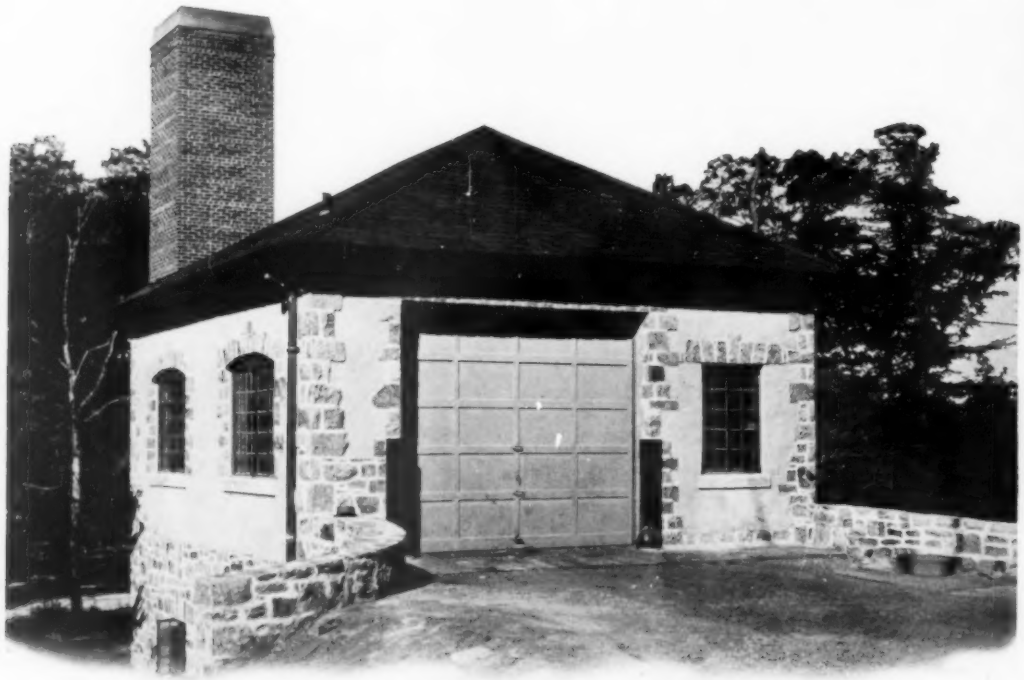
DECEMBER 4-5.—HOUSTON, TEXAS. (100)
Texas City Attorneys' Association. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

DECEMBER 28-30.—WASHINGTON, D. C. (400)
National Community Center Association. Annual meeting. Secretary, LeRoy E. Bowman, 403 Fayerweather Hall, Columbia University, New York.

JANUARY 9-15.—DETROIT, MICH. (25,000)
American Road Builders' Association. Annual convention and Road Show. Engineer-Director, Charles M. Upham, National Press Building, Washington, D. C.

JANUARY 25-29.—MILWAUKEE, WIS.
American Institute of Electrical Engineers. Annual winter convention. National Secretary, F. L. Hutchinson, 33 West 39th Street, New York.

A "Pittsburgh-Des Moines" Incinerator Solved the Clean-Up Problem for Scarsdale, N. Y.



No auxiliary fuel required

No smoke—no odors

Simple fool-proof operation

Sturdy, dignified construction

A distinct community asset

Interested municipal officials write today for the PDM Incinerator catalog. It presents interesting photos and tells how other cities have solved their sanitation problem with a "Pittsburgh-Des Moines."

The knowledge and experience gained from 38 years of municipal contracting are back of every "Pittsburgh-Des Moines" installation. The scientific destructor unit shown above has a daily capacity of 15 tons of garbage and refuse every 24 hours. This plant operates an average of 18 hours per day under normal conditions.

Public garbage dumps and refuse piles are germ-laden and dangerous breeding-spots of disease. The unsightly appearance and offensive odors of these town "sore spots" offend the whole community. Modern sanitation demands their complete elimination by the installation of an efficient and reliable incinerator.

The "Pittsburgh-Des Moines" incinerator is today rendering a dependable and economical "day-in-and-day-out" clean-up service to progressive cities and small, clean communities in every part of the United States.

Pittsburgh-Des Moines Steel Company

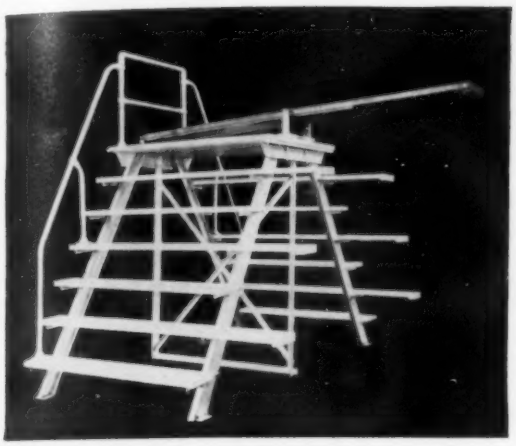
Room 941, 270 Broadway, New York, N. Y. **3452 Neville Island, Pittsburgh, Pa.**

Des Moines **San Francisco** **Seattle** **Chicago** **Atlanta** **Dallas**

When you write for that catalog, kindly mention THE AMERICAN CITY

NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings



AMERICAN COMBINED DIVING TOWER AND SPRINGBOARD

New Diving Tower Accommodates Seven Divers at a Time

A combined diving tower and springboard that will accommodate seven divers at one time from four different heights above the water has been brought out by the American Playground Device Co., Anderson, Ind.

The illustration shows a diving stair tower with an American 12-foot oak springboard mounted on the deck platform. The diving end of the board is just 10 feet above water level. Each alternate stair tread extends 2 feet over the edge of the pool and serves as a diving board. These accommodate two divers each at heights of 3 feet, 5 feet and 7 feet in addition to the springboard.

This company has also developed a new water slide with a bottom of nonmetallic material which will not break or tear and cannot rust. It will resist the friction of sliding for many years, and it is said that the longer it is used, the "slicker" it becomes, increasing the speed of the slide. New chutes of this material may be attached to the stairways of other makes of slides.

Contract Awarded for Water System at Boulder City

Official notice of the award of the contract for pipe for the water distribution system at Boulder City, Nev., the Government model town at the site of the Hoover Dam, has been received from Washington. The contract, amounting to $27,000, was awarded to the Pacific States Cast Iron Pipe Co., Provo, Utah, through its district office at Denver. It covers approximately 9 miles of McWane cast iron pipe ranging in size from 2- through 12-inch, weighing 1½ million pounds.

Most of the pipe, including sizes from 2-inch through 8-inch, was shipped from the Pacific States Foundry at Provo, Utah, and the rest, including 10- and 12-inch, was shipped from the McWane Foundry, associated with the Pacific States Co., at Birmingham, Ala. Shipment started on June 4 and was completed by June 24, when the work of installing it was well under way. There were eight other bidders, the lowest being rejected as irregular.

A Centrifugal Pump for Liquids Carrying Solids

Centrifugal pumps for liquids carrying solids which tend to cause clogging involve special problems of design. The Clogless pump which has been developed by the DeLaval Steam Turbine Co., Trenton, N. J., particularly for handling sewage, paper pulp and similar liquids, has a casing split in the plane of the shaft, with the discharge connection in the lower half, or casing proper. The casing cover can therefore be lifted off without disturbing the discharge pipe connection and after only partial unbolting of the suction pipe connection. All internal parts and passages are then accessible, and the rotaing element, with bearings, can be lifted out, after loosening the bearing cap.

A large handhole, with easily removable cover, on the cover half of the suction nozzle, gives quick access to the suction side of the impeller for inspection and cleaning. The suction nozzle is designed for a large-size suction pipe, insuring low pipe velocities and low total suction head, which is conducive to smooth and efficient operation of the impeller.

The passages through the impeller are extra-wide, both between the side plates and between the vanes. Ordinarily, only two vanes are used, proper guiding of the liquid without cavitation or shock being attained by suitable selection of the speed and of the impeller diameter. By suitably proportioning the impeller passages and volutes, these pumps, which are operated at slow speed, have been made to compare favorably in efficiency with standard high-speed clear-water pumps. Where the pump capacity or the nature of the liquid permits, the number of impeller blades is increased to three or four, permitting of higher speed.

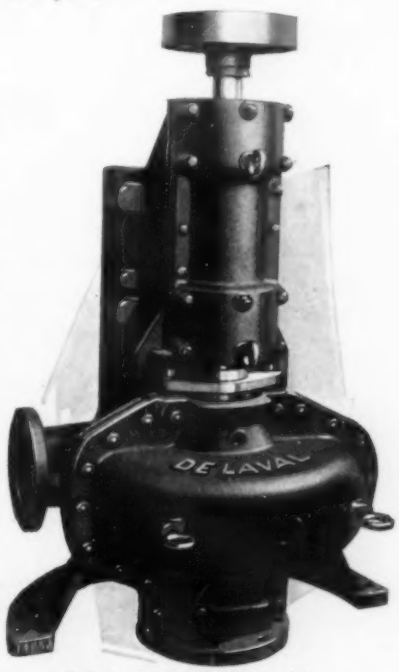
At the joint between the impeller and the casing, the impeller is protected by a bronze ring threaded upon it, while the casing is protected by a stationary bronze ring seated in recesses formed in the casing and casing cover and therefore removable when the cover and rotor are lifted. A circumferential slot in the stationary ring communicates with a tapped opening through the casing cover to provide for sealing with clear water under a pressure slightly higher than that generated by the pump, in order to prevent liquid and abrasive matter handled by the pump from entering between the rings.

For some services an open impeller is used with removable stationary side plates of special form held in recesses in the pump casing and cover to guide the liquid during its passage through the impeller.

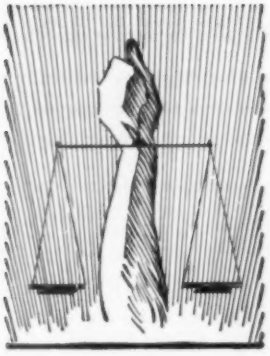
For vertical shaft operation, the pump is constructed as for horizontal operation, the thrust bearing being heavy enough to take all additional load imposed by the weight of the rotor. The pedestal or foot of the pump can be bolted to I-beams or channels, involving no change whatever from the horizontal design, or a semicircular foot for supporting the pump on the floor can be cast as part of the casing.

Asphalt Emulsion Company Changes Name

Colas Roads, Inc., is the new name of the company formerly known as Flintkote Roads, Inc., of New York and Boston. This change in name has been made in order to identify the name of the company more closely with its product and does not involve any alteration of the organization. The company reports that the increasing demand for Colas has resulted in the building of two new plants.



DeLAVAL CLOGLESS PUMP

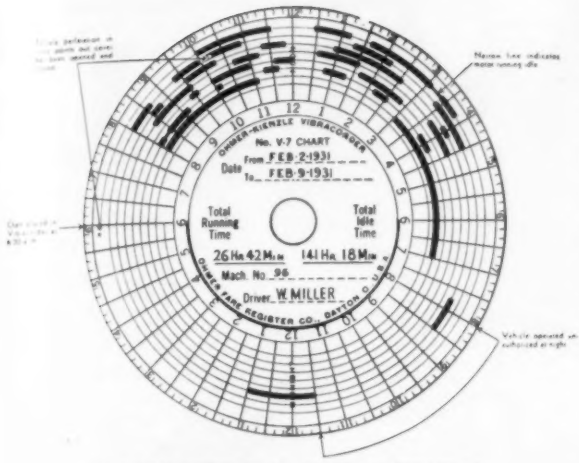


the only consideration *first cost* should be given in determining upon the selection of *pavements* is to supply a basic figure from which to determine *annual costs*

For information on the annual cost of *BRICK* paving address inquiries to National Paving Brick Manufacturers Association, National Press Building, Washington, D. C.

VITRIFIED
BRICK PAVEMENTS

Face the Future—Pave With Brick



A 7-DAY RECORD OF TRUCK OPERATION FROM AN OHMER VIBRACORDER

The heavy lines indicate busy time, the medium lines indicate motor running idle, and the light lines the vehicle or machine idle

Recording Busy and Idle Truck Time

A new device which records the exact clock time that any motor vehicle or any piece of machinery is in operation or is idle, known as the Ohmer-Kienzle Vibracorder, has been announced by the Ohmer Fare Register Co., Dayton, Ohio.

A small paper disc 5 inches in diameter, taken from the instrument once a week, tells the whole story of seven days' operation. It is operated by vibrations or oscillations, which are always present when a motor vehicle or any piece of machinery is running.

The Vibracorder resembles a small clock and, as a matter of fact, is really a high-grade, 8-day, 6-jewel clock with an easily read dial, which assists the driver of a motor vehicle or the person supervising the operation of machinery to keep his work strictly up to schedule. In addition to moving the hands of the clock, the mechanism rotates a drum within the instrument bearing a specially prepared disc or chart under the point of a steel stylus or pen point.

The chart is laid out with spaces for minutes, hours and days and for both day and night operation.

McCarthy Transferred from Chicago to Boston

The Gamewell Co., Newton, Mass., has announced the transfer of E. J. McCarthy from its Chicago to its Boston office, where he will cover the state of Rhode Island and several counties in Massachusetts in the capacity of Sales Engineer.

Harder Joins Pardee Engineering Co.

The Pardee Engineering Co., 3915 29th Street, Long Island City, N. Y., has announced that V. J. Harder is now handling the sales and servicing of Pardee water treatment equipment in the Buffalo area. His address is 20 Chapel Road, Kenmore, N. Y.

Valve Boxes with Flared Bases

Valve boxes of the three-piece, screw adjustable type are made by the Columbian Iron Works, Chattanooga, Tenn. They are extra-heavy for roadway service and have a deep socket type of covering which prevents the covers from being accidentally knocked out of position.

Being screw adjustable, the boxes can be adjusted to the correct height to come in line with the surface of the street. The smallest inside diameter is 5 inches, and all sizes have ample space for opening or closing the valve.

COLUMBIAN SPECIAL VALVE BOX WITH FLARED BASE

The Columbian special valve box has its base flared in such a manner as to encase the bonnet and rest upon the bonnet flange of the valve. All boxes are painted with two coats of pitch tar varnish composition and are made in different sizes to fit over any size of valve and for any depth of trench.

A New Line of Motor Trucks

The new line of motor trucks offered by the Sterling Motor Truck Co., Milwaukee, Wis., includes 29 distinct models of various capacities from ¾ to 12 tons, in a broad array of wheelbase lengths in bevel, worm, double reduction, chain and dual drives for commercial and dump hauling. In addition to embodying many new mechanical developments, the appearance of the trucks has been greatly enhanced. Such refinements as V-type radiators with wind deflectors, long, sweeping crown fenders, hinged hood louvres, elaborately finished instrument panels and de luxe cabs with adjustable seats and backs are apparent in the various models.

The bevel drive trucks include six models from ¾ to 4 tons capacity. They are built for speed and equipped with hydraulic four-wheel brakes, the larger models having boosters to increase their braking efficiency.

Five double reduction drive speed trucks of medium to heavy carrying capacities are offered with wheelbase from 126 to 222 inches. The four larger models are also supplied as tractors and dump units.

Four models are offered with worm drives, with axles by Timken and disc steel wheels by Budd. All engines have the Ricardo Red Head combustion chambers. Wheelbase lengths of these models vary from 126 to 230 inches, suitable for tractor, dump and commercial hauling.

Many improvements have been incorporated in the chain drive series. The line consists of seven models from 5 to 10 tons. All models have four speed transmissions, and at a moderate additional cost a Sterling patented auxiliary transmission is installed, giving 12 forward speeds.

In the dual chain drive models, an entirely new principle in 4-wheel chain drive provides perfect differentiation for all wheels and accurate division of power for each wheel.

In addition to dual chain drives, this company also offers a complete range of dual worm drives from 3½ to 12 tons.

On all models except the FB-30 and 35, both bevel drive trucks, the patented Sterling wood-lined frame is featured. Deep section side members are used, and into these, solid seasoned oak planks are machine-pressed.

Osgood Has New Branch

The Osgood Co., Marion, Ohio, has announced the establishment of its Greater New York Sales and Service Branch at 1038 Hoyt Avenue, Ridgefield, N. J., where it has purchased its own site and building for the new branch.

New Manager for Holophane

The Holophane Co., 342 Madison Avenue, New York, has announced the appointment of A. D. Cameron as Manager. Mr. Cameron was formerly Manager of the Lighting and Supply Division, Central Station Department, General Electric Co., Schenectady, N. Y., and was later Vice-President of the Hall Electric Heating Co., of Philadelphia.

STERLING MODEL FC-140 WITH 7-YARD DUMP BODY

SINCE 1867

COLDWELL POWER

Above: Coldwell "Twin-Thirty" motor lawn mower and roller. Mows and rolls simultaneously 6 to 8 acres a day on one gallon of gasoline.

Dependability

IN your lawn mowing and rolling equipment implies a well designed, well built machine, capable of producing the finest possible results with the least expense.

The Coldwell Dependable Power Lawn Mowers and Rollers have a sustained reputation throughout the Country for just such DEPENDABLE PERFORMANCE.

Sales and Service Representatives in every locality. Write for details.

COLDWELL LAWN MOWER COMPANY, NEWBURGH, N. Y., U. S. A.

In Canada—Taylor-Forbes Co., Ltd., Guelph

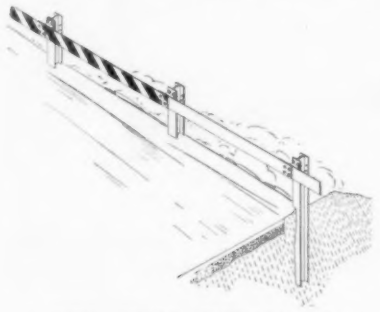
Manufacturers of DEPENDABLE Lawn Mowers—Hand, Horse, Gasoline, Electric

A Guard for Modern Roads

A strong, safe and economical road guard, consisting of steel plates bolted to steel columns or posts, has been designed by the American Institute of Steel Construction, 200 Madison Avenue, New York, to meet the needs of modern day motoring. The Institute has filed patent claims on the design to make sure that it can be used by all fabricators and erectors without fee and without extra charge to the public.

The posts consist of 6-inch steel H-column which can be driven into the ground with a light portable pile driver, thus eliminating the necessity of digging holes and at the same time providing a rigid post. Where there is no embankment, the posts are driven vertically, but for embankments or fills where there is not sufficient earth to hold a vertical post, they can be driven toed-in at an angle which will insure ample earth resistance.

With both types of posts there is a bracket which carries the steel plate guard far enough away from the post to prevent impact against the post itself. Where the posts are vertical, the brackets can be bolted to the post with ver-

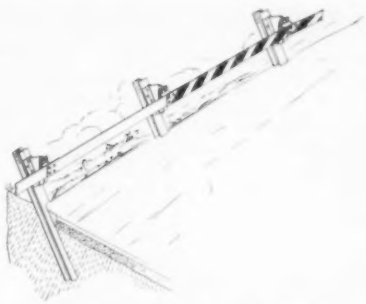


STEEL GUARD INSTALLATION ON VERTICALLY DRIVEN POSTS

tical adjustment from extra holes punched in the post flange. A horizontal adjustment can be had by using shims of wood or steel. Where inclined posts are used, the holes in the post flange provide vertical and horizontal adjustment, and the holes in the vertical face of the triangular bracket provide additional vertical adjustment.

The steel plates are 8 inches wide and ¼- or 3/16-inch thick, and, bolted to the bracket face, their action will be similar to that of a steel cable the width of the plate. The holes at one end of the plate are 13/16-inch in diameter for ¾-inch bolts, and at the other end 1¼- or 1½-inch slotted holes provide for inaccuracy of the driving of the posts and of road grades.

With the bolts drawn up tight, the flexibility of the plate and the friction between the plates at the large holes will serve to take up sharp impact stresses. The plates and brackets possess both the strength and the flexibility to meet service conditions without serious injury to the post, and when plates or brackets are bent, they can be cold-straightened or replaced by new parts on the original posts. The plates are located above the center of gravity of the ordinary auto-



INSTALLATION OF STEEL ROAD GUARD WHERE POSTS ARE SET AT AN ANGLE

mobile and prevent overturning. The space below the plates permits snow to blow off the roadway instead of forming drifts such as may be caused by solid walls.

A Special Golf Course Tractor

The new Case Model CI Golf Course Special tractor, made by the J. I. Case Co., Racine, Wis., is a compact, lightweight tractor suited to low-cost construction and maintenance of golf courses, large estates, parks and cemeteries. Fairway maintenance, mowing the rough, and construction jobs can be done quickly and at low cost with this tractor. It will pull a battery of mowers at a fast clip and will plow, seed, fertilize, haul dirt or sand and move equipment. In addition to drawbar work, it will operate a pump or other belt-driven machines. Power is also available at the power take-off.

Its compact size and short turning enable the tractor to maneuver loads in and out of close quarters and under low-hanging branches of trees. The tractor is only a little over 4 feet high and turns inside a 10-foot radius. One advantage is its light weight, of slightly more than two draft horses. The smooth steel wheel rims are flanged at the edge and equipped with golf-course spuds to prevent damaging the grass.

A simple fuel system functions economically on either gasoline or kerosene. All air entering the carburetor is first thoroughly cleaned of impurities by the Case oil filter air cleaner. The large fuel tanks are a great convenience and save time.

The tractor has three speeds, of 2.77, 3.94 and 5.42 miles per hour. It has a 66-inch wheelbase, the front wheels being 28 x 5 inches with the 5-inch extension rims which may be attached, and the rear wheels 42 x 12 inches without the 6-inch extension rims. The engine has a 3⅞-inch bore, a 5½-inch stroke and a speed of 1,100 r.p.m.

CASE GOLF COURSE SPECIAL TRACTOR

Turner Now Vice-President of Eagle Signal Sales

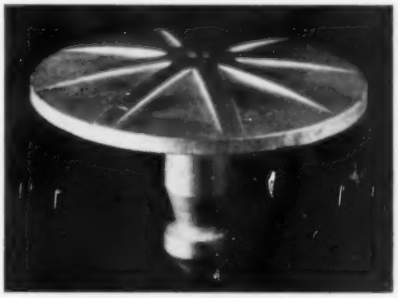
H. I. Turner, Assistant General Manager, Eagle Signal Sales Corporation, Moline, has just been advanced to Vice-President and General Manager. Mr. Turner was formerly Construction Manager for the Gamewell Co., Newton, Mass., of which the Eagle Signal Sales Co. is a subsidiary.

Kennedy Moves Los Angeles Office

The Los Angeles, Calif., office of the Kennedy Valve Manufacturing Co. has recently been removed to 706 Bendix Building.

Aluminum Alloy Traffic Markers

Forged from a solid slug of aluminum, alloyed with manganese and silicon, Thompson traffic markers, made by

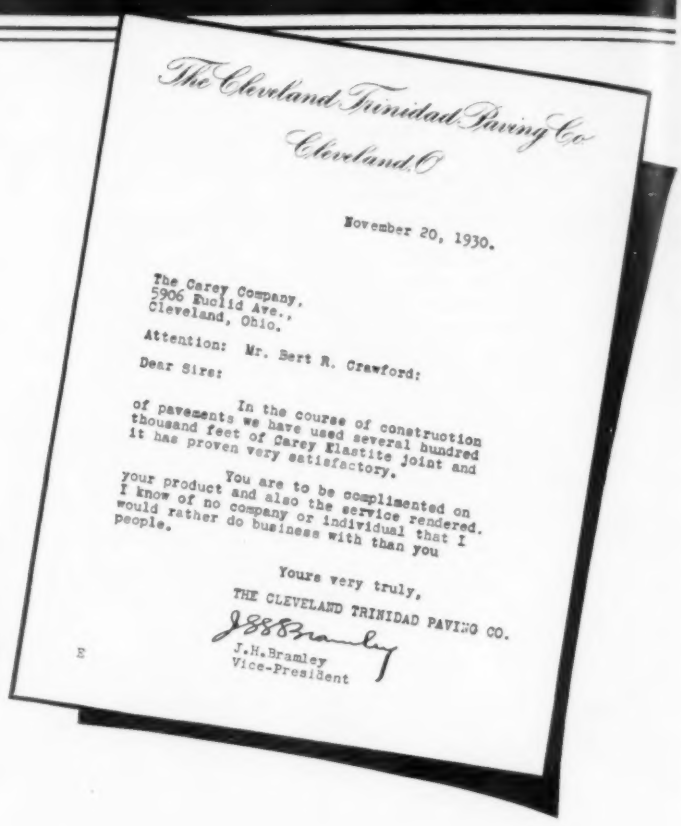


THE THOMPSON FORGED ALUMINUM TRAFFIC MARKER

Thompson Products, Inc., Cleveland, Ohio, will not corrode, are resistant to abrasive wear and are polished from the action of tires. Safety ribs on the head of the markers protect pedestrians against slipping on the shiny surface. The markers are easily installed, as they are unbreakable and can be driven into asphalt with a sledge or air hammer, saving the cost of drilling the pavement during the summer months. The long stems of the markers ground in the road-bed, and the underhead contour prevents creeping. The locking device is sure and does not impede installation.

Road Builders prefer

Carey Elastite EXPANSION JOINT


The Cleveland Trinidad Paving Co
Cleveland, O

November 20, 1930.

The Carey Company,
5906 Euclid Ave.,
Cleveland, Ohio.

Attention: Mr. Bert R. Crawford:

Dear Sirs:

In the course of construction of pavements we have used several hundred thousand feet of Carey Elastite joint and it has proven very satisfactory.

You are to be complimented on your product and also the service rendered. I know of no company or individual that I would rather do business with than you people.

Yours very truly,
THE CLEVELAND TRINIDAD PAVING CO.
J.H.Bramley
Vice-President

.... because

Quality and Delivery are Certain

The preference for Carey Elastite Expansion Joint is based on performance. The material itself is made on scientific principles that time has proven to be correct. The tempered asphalt compound is protected by strong felt walls facilitating handling and installation, and exclusive Carey machinery insures accurate dimensions. Carey Elastite neither softens unduly in hot weather, nor becomes brittle in cold.

For twenty years a nation-wide corps of distributors has been delivering Elastite Joint to the job when required. A force of experienced highway engineers has always been available to provide any desired information regarding specifications or installations.

If you have not adopted Carey Elastite Expansion Joint, it will pay you to get in touch with the nearest Carey distributor. His name, together with a 1931 Price List, will be sent to you on request.

THE PHILIP CAREY COMPANY ✖ Lockland, Cincinnati, Ohio
Branches in Principal Cities

BUILT-UP ROOFS
ASPHALT PRODUCTS
ELASTITE EXPANSION JOINT
WATERPROOFINGS
ROOF PAINTS

Carey PRODUCTS EST. 1873

HEAT INSULATIONS
ASBESTOS MATERIALS
CAREYSTONE CORRUGATED SIDING
ASFALTSLATE SHINGLES
BUILDING PAPERS

545

POURING G-K COMPOUND IN THE TRENCH

Joints for Vitrified Sewer Pipes

The jointing of a vitrified tile pipe sewer is a very small item in the whole cost of the system, so that it is often not given the thought to which its importance entitles it. G-K compound, made by the Atlas Mineral Products Co. of Pennsylvania, Mertztown, Pa., is a quick-heating and smooth-running sewer joint compound with an acid- and alkali-proof filler. It will not become brittle with age, but always retains a certain degree of flexibility and, by preventing infiltration, renders the laying of sub-drains unnecessary, regardless of the head of ground water.

The use of this compound does not require skilled labor, as any laborer of ordinary intelligence becomes proficient in its handling after pouring a few joints. The method of making joints with G-K compound is as follows: The bell and spigot of the pipe should first be thoroughly cleaned, using a wire brush, if necessary. The inside of the bell and a few inches of the spigot end of the pipe should be painted with G-K Primer, allowing at least four hours for this to dry before the pipe is laid. The compound should be melted in a cast iron melting pot over a coal or wood fire or a gasoline burner until by test with a ladle the compound flows as freely as water. It should be stirred up from the bottom when melting to prevent coking.

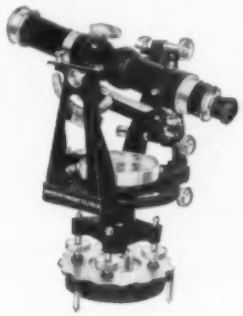
In yarning the pipes to be jointed on the bank, only dry unoiled jute should be used. The pouring pot should be large enough to complete each joint at one pouring. If jointing two or more ends on the bank is allowed, the pipe should be stood in a vertical position and calked with well-twisted, dry, unoiled jute to a depth of not more than one-fourth the annular space and the joint poured without using a runner. Care should be taken to preserve the proper alignment of the pipe at all times.

In the trench when the pipe is at grade and butted, a gasket of well-twisted, dry, unoiled jute, long enough to go around the pipe, should be calked into the back of the annular space so that only one-fourth of the space is filled with jute and the remaining three-fourths left for G-K compound. An asbestos runner moistened with puddled clay is then placed around the pipe and against the bell, keeping the bell and spigot free from dirt and water. The runner should be placed with the opening slightly off center on the side which has the larger annular space, if there is any difference, and the mud gate built up to insure the flow of compound entirely around the pipe. The runner is then clamped, leaving a V-shaped opening in which to pour. The compound should be poured in so that it will run around the pipe, completely filling the annular space. The runner is then removed, leaving a finished joint.

Y's and T's should be sealed with tile cap stoppers dipped in hot compound before the branch is lowered into the trench. When future house connections are made, these can be removed with a blow torch without danger of breaking the bell.

A New Combination Transit and Level

The new Transit-Level, which is made either with or without compass and with or without a vertical arc, as desired, has been developed by the Warren-Knight Co., 136 North 12th Street, Philadelphia, Pa. This instrument is the result of an ever-increasing demand for a combination instrument which can be used for both transit and level work without the necessity for changing the instrument in any way.



THE NEW WARREN-KNIGHT TRANSIT-LEVEL

The instrument is entirely new in design, with a new optical system and new dual bearing standards, as well as a new and exclusive feature which enables the adjustments of the telescope and level to be checked as easily and in the same way as an ordinary wye level. It is an accurate, compact instrument, conveniently packed in a substantial hardwood carrying case, complete with trivet, plumb bob, reading glass, sunshade and tripod.

The Transit-Level has a maximum tilt of 110 degrees from 55 degrees above to 55 degrees below the horizontal. The horizontal or graduated circle has a vernier reading to single minutes and is fully protected by a heavily ribbed top plate. The telescope, with level attached, is provided with a clamp and tangent for quickly and accurately taking level readings, and has lenses with magnifying power of 22 diameters and a special combination which enables a sharp sight as close as 4 feet from the center of the instrument. The instrument itself has a full three-quarters shift on the tripod plate. The tripod plate and tripod are furnished with U. S. Standard thread, and the tripod plate is equipped with three detachable pins, enabling the plate to be used as a trivet.

New Vice-President for McIntosh & Seymour

At a recent meeting of the Board of Directors of the McIntosh & Seymour Corporation, Auburn, N. Y., John Thomas was appointed Vice-President in charge of sales. Mr. Thomas became General Sales Manager October, 1930.

Unusual Truck for Baltimore

A 1½-ton Federal truck, equipped with 1½-yard Wood gravity dump body, was recently delivered by the Federal Motor Truck Co., Detroit, Mich., to the city of Baltimore, Md. The unit was lengthened 42 inches to take care of a Jaeger 300-gallon-per-minute pump.

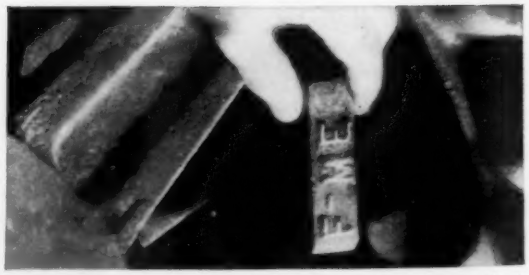
The equipment is to be used for cleaning out manholes, the accompanying photograph having been taken when the truck was being used in splicing the main electric cables in Baltimore. The outfit has three inlets, one on each side and one at the rear, so that it can be operated in narrow alleys and other close quarters. The cab over the pump has seating arrangements for a crew of three men, and the front of the cab has a tool box to accommodate boots, coats and other accessories.

FEDERAL TRUCK WITH WOOD BODY AND JAEGER PUMP OWNED BY THE CITY OF BALTIMORE, IN USE FOR SPLICING ELECTRIC CABLES

HERE is a "Caterpillar" Sixty buffeting bumps on a levee job—demonstrating how the "Caterpillar" wear-resistant, shock-resistant, long-lived tracks grin at grit and grind—demonstrating how the heat-treated steels of the "Caterpillar" Tractor insure long life for wearing parts.

It is scientific, carefully controlled heat-treating of links, pins, gears and other parts that armors this tractor against shock and wear—that enables the "Caterpillar" owner to tackle his jobs with an assurance of uninterrupted service and timely completion—that guarantees to the "Caterpillar" purchaser highest returns on tractor investments—that adds to the eventual turn-in value of the "Caterpillar" track-type Tractors.

TOUGHENED TO TAKE THE JOLTS



An extra test lug is cast on final drive sprockets. "Caterpillar" metallurgists break these off and carefully examine them before accepting the sprockets.

Caterpillar Tractor Co.

PEORIA, ILLINOIS, U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

Prices—f. o. b. Peoria, Illinois

TEN	$1100	TWENTY	$1900
FIFTEEN	$1450	THIRTY	$2375
SIXTY	$4175		

CATERPILLAR

REG. U. S. PAT. OFF.

TRACTOR

Do you mention THE AMERICAN CITY? Please do.

THE LITTLEFORD NO. 86-B CRACK AND JOINT FILLING POT

A Springless Road Joint Filler

The cone-shaped crack or joint filler is not new to the highway field, but Littleford Bros., 500 East Pearl Street, Cincinnati, Ohio, have developed a springless pot that is claimed to simplify operations and give more positive action.

Littleford Crack and Joint Filling Pot No. 86-B has a rated capacity of 2½ gallons. Flow of the asphalt is controlled by a weighted valve that can be easily opened or closed. The valve seat at the bottom of the pot is made of cast iron and is heavy enough to be of material assistance in retaining heat to prevent congealing of the bitumen at this point. The pot is constructed of sheet steel with strongly welded seams and can be thoroughly heated in a fire without injury.

The top of the pot is the proper height to go under the draw-off cock of an asphalt heating kettle, and the discharge nozzle can be changed to a ⅝-, ½-, or ⅜-inch opening.

The pot is designed for use by paving contractors and city, county and state highway departments in filling cracks and joints in concrete pavements and the interstices in brick and granite block pavements.

Changes Among Westinghouse Officials

J. C. McQuiston, General Advertising Manager of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has announced his retirement, effective June 1, 1931. For 29 years, Mr. McQuiston has been in charge of advertising for that company.

At a recent meeting of the Board of Directors of the Westinghouse Electric & Manufacturing Co., J. S. Tritle was elected Vice-President and General Manager in charge of manufacturing, sales and engineering operations of the company, reporting to President F. A. Merrick, and with headquarters in the main works at East Pittsburgh. Mr. Tritle has been with the company for many years in various capacities.

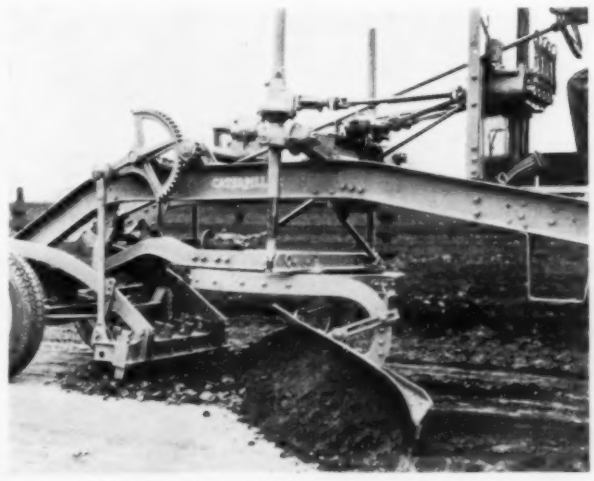
An Easily Controlled Maintenance Machine

A new heavy-duty maintenance machine in which the steering wheel is the only manually operated control has been placed on the market by the Caterpillar Tractor Co., Peoria, Ill. The other controls of this machine are conveniently located in front of the operator and effect the raising and lowering of the scarifier, the raising and lowering of the blade, swinging the circle and shifting the blade from side to side. The power is supplied through a take-off from the engine.

On first speed this maintainer will do a good job of scarifying, as it has weight, power and traction. The scarifier has a double row of teeth, which gives more clearance between the teeth for larger particles. First speed is also adapted to oil-mix work as well as very heavy blading work. Second speed is a good rate for normal surface maintenance work, and third speed for lighter surface maintenance work. Fourth speed is a special high speed to be used in traveling from one job to another, the cushioning on six big pneumatic tires making this possible without undue vibration.

The engine used on this machine has been tried and proved for a number of years on one of the standard Caterpillar tractors. It is mounted in the main frame behind the operator's seat. The power plant is easily accessible and does not obstruct the operator's vision, and the heat and exhaust gases are carried back away from the operator. The location of the engine also places the proper weight on the rear dual pneumatic tires to give the maximum traction. The direct drive to the rear wheels eliminates much of the tire wear due to slippage of one of the wheels when it gets into a soft spot and spins. This feature enables the machine to work under all weather conditions. In winter when equipped with a snow-plow, it may be used for snow removal work.

The Caterpillar Auto Patrol is equipped with generator, battery and lights which give a steady powerful flow of light, making possible the use of the machine day and night, thus giving more work to more men and keeping the roads in better condition without additional investment in equipment.



CLOSE-UP OF THE CATERPILLAR AUTO PATROL

A Portable Emergency Light

A portable light which projects a ray of 300,000 beam candlepower capable of illuminating an object a half-mile distant is made by the Portable Light Co., Inc., 12 Warren Street, New York.

All metal parts of this Half-Mile-Ray searchlight are of heavy cast brass, nickel-plated, and are put together with brass screws, making all parts easily interchangeable, so that a damaged reflector or bracket can quickly be replaced. There is nothing to rust or get out of order.

THE HALF-MILE-RAY SEARCHLIGHT

The illustration shows one of these outfits with the new running-board holder. This consists of a searchlight with carrying handle, mounted on a steel box which contains the storage battery. The battery is of the 3-cell, 6-volt type, of 15 amperes capacity. It will operate the light continuously for 6 hours, or intermittently about 7 hours, and can be recharged at a cost of a few cents for current. The weight of the entire unit is 13 pounds. The holder may be mounted on the running-board or other convenient part of the truck or apparatus.

It can also be operated on a Hot Shot dry battery or mounted with brackets on an automobile.

Court Street, Niagara Square to Terrace, Buffalo, N. Y., paved with Native-Lake Asphalt in 1899. Total maintenance cost over 31-year period, less than ½ cent per square yard

Maintenance cost less than ½c per sq. yd. for 31 years

Such a record of long service and economy demonstrates the value of Trinidad Lake Asphalt as a street paving material.

There are millions of square yards of Trinidad Lake Asphalt pavements which have successfully withstood the ravages of traffic for more than twenty-five years.

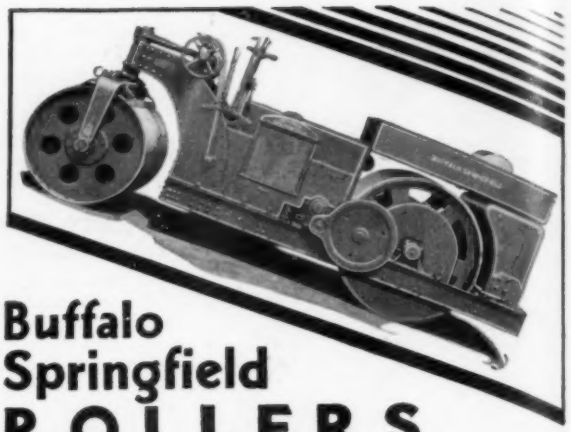
City engineers and public officials who are interested in getting smooth, resilient, dustless and above all enduring pavements for new construction or as a resurfacing over old brick, concrete or stone block, can get a pavement meeting these requirements by specifying Trinidad Lake Asphalt.

We also supply Bermudez Road Asphalt for road building. Interesting data and other particulars furnished on request.

THE BARBER ASPHALT COMPANY

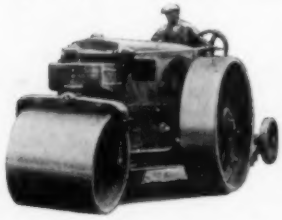
New York PHILADELPHIA Chicago
St. Louis Kansas City San Francisco

TRINIDAD NATIVE LAKE ASPHALT



Buffalo Springfield ROLLERS *for* Service — Long Life

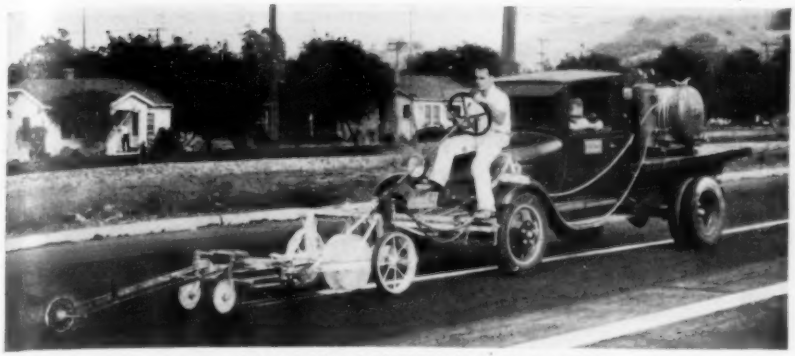
IT is when adverse operating conditions demand an extra measure of stamina and agile power that Buffalo-Springfields show to best advantage. No matter how strenuous the road building or maintenance requirement, the Buffalo-Springfield roller excites the admiration of constructors and all others qualified to pass judgment.



Built in a wide range of models and sizes, both steam and motor driven, 2½ to 15 tons. Scarifier and other attachments optional.

THE BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD, OHIO

Buffalo-Springfield ROLLERS



THE ESSICK TRAFFIC LINE MARKING MACHINE

A New Speedy Lane Marker for Highways

Where 15 or 20 miles of state highway is to be marked with a dividing line in the center to separate traffic bound in opposite directions, particularly near the crests of hills and at curves, hand painting of the center stripe is out of the question. A machine which is affixed to the front of a light truck and which will handle from 12 to 15 miles of paving striping per day, has been developed by Essick & Co., Santa Fe Ave. at 14th St., Los Angeles, Calif.

The carriage, carrying the spray gun which paints the line, is simply a three-wheel affair with a steering wheel and two revolving discs which determine the width of the line. The operator sits on the front of the truck or on the gun carriage, as may be desirable. The truck which furnishes the motive power has had the steering knuckle disconnected, so that the driver cannot guide the truck, but uses only his throttle and brake.

On a running-board in the rear, a laborer drops small flags over the striping to keep traffic from crossing the striping until it is dry. A fourth man, some two miles in the rear, picks up these flags by spearing them with a stick through a loop in the wire standard which supports the flag. With this system all operators ride and the speed is several times that of any other method. The truck carries a compressor, a gasoline engine and a large pressure tank containing the paint. Often as much as 200 gallons of paint is placed in the tank at one time. This gives an all-day run without stopping to reload. The virtue of the machine lies principally in the fact that it is in front of the truck. In this way, it is free from side-sway, the operator has clear vision, and the difficulty of following the spots or chalk lines laid down by the locating engineer is reduced to a minimum. With this machine 5 men will handle from 12 to 15 miles of paving striping per day and make a straight line of any width up to 12 inches. The use of this machine makes it possible to buy paint in drums at a saving of 10 cents per gallon over paint bought in cans. This saving amounts to about $1.50 per mile. No thinner is necessary, which makes an additional saving of about $3 per mile. Furthermore, the machine operates so fast that traffic is interrupted for a minimum length of time.

Automatic Control of Traffic by Sound and Light

Designed to speed and safeguard the movement of traffic at highway intersections, the Adler Sound-Light signal system developed by Charles Adler, Jr., Maryland & Penn. R.R. Building, Baltimore, Md., is controlled by movement by the detection of the sound of vehicles passing over inert hollow steel boxes imbedded in each of the four approaches to an intersection. The steel boxes contain no mechanism, the hollow interior merely concentrating and conveying the sound of vehicle tires as they pass over the boxes through tubing to microphones. These convert the sound waves into electrical impulses, and these in turn control the signal.

The green indication is displayed to the road having the greater volume of traffic, automatically switching to the other road when traffic conditions are reversed. When there is no traffic on one road, the green signal is constantly displayed to the other highway. When the traffic volume on each road becomes equal, the signal balances the movement on each highway past the crossing accordingly.

Designed upon scientific optical principles, the three-color signal unit projects all three colors, red, amber and green, from one large lens facing each highway. This new signal presents to the motorist a single, understandable color at a time, that cannot be confused or misread. The color aspects of the signal have certain characteristics which register instantly upon the optic nerves. Recent tests by a well-known eye specialist proved that a color-blind subject, driving up to the signal, had no difficulty in instantly recognizing each color indication.

The signal contains, for the usual type of intersection, four continuously illuminated bulbs. Should any of these lamps burn out, each lens will still display all of the three colors by the illumination from the remaining bulbs.

Engineers Withdraw Suit Against City

The suit of Randolph-Perkins Co., Engineers, v. City of Evanston, Ill., on account of abrogation of a contract in connection with the city's ornamental street-lighting plan, has been withdrawn. In settlement, the city has paid the engineers a final sum of $20,000 and has passed a resolution withdrawing any derogatory statements or implications "reflecting upon the professional integrity, good faith, ability or reputation of Randolph-Perkins Co. as engineers."

New Dorr-Oliver Corporation

On June 1, by the formation of a new company, to be known as the Dorr-Oliver Corporation, John Van Nostrand Dorr and Edwin Letts Oliver announced a union of the businesses and assets of the Dorr Company and Oliver United Filters Inc., under the joint management of Messrs. Dorr and Oliver.

The Dorr-Oliver Corporation will function through its two wholly-owned operating units, a new Dorr Company, Inc., and a new Oliver United Filters Inc. Mr. Dorr and Mr. Oliver will head their respective companies and, with the aid of their present executive and technical staffs, will continue on behalf of Dorr-Oliver Corporation the businesses which they have individually initiated, organized and expanded so successfully.

New Company Organized

The Nelson Play Equipment Co., 3430 West Forest Home Avenue, Milwaukee, Wis., announces its entrance into the playground equipment field after months of research work, specializing in home and kindergarten play devices. R. L. Nelson, who has been associated with a playground manufacturing company for the past 15 years, is President.

ADLER SOUND-LIGHT SIGNAL SYSTEM INSTALLED AT 5-WAY INTERSECTION OF MT. ROYAL TERRACE, LAKE DRIVE, PARK TERRACE AND PARK AVENUE, BALTIMORE, MD.

Outdoor Lighting

A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

Memphis Street Lighting Now 100 Per Cent Electric

By SAM M. JACKSON
Commissioner of Public Utilities, Grounds and Buildings, Memphis, Tenn.

PROGRESS of street illumination in Memphis, Tenn., passed another milestone during the last week in June, when gas lighting, which is still in use in some of the older cities of this country, was entirely superseded by electricity. Nearly a thousand gas lamps that still remained in the city were removed, in accordance with a seven-month change-over program.

More Light at Less Cost

By the change 115,740 candlepower was added to the Memphis street-lighting system, and at the same time the annual cost to the city was decreased by $1,011. Some 1,200 gas and electric lights were affected by the change-over agreement, and for these the average cost per candlepower was 42 cents, but with the complete adoption of electric lights, accompanied by a change in the rates, the average candlepower cost on this group of lights was reduced more than half, to 19 cents per candlepower.

TYPICAL OLD GAS LAMP

Last November there remained in Memphis 986 gas-light vestiges of antebellum days. The city now has 5,410 street lights, all owned by the Memphis Power & Light Co., which receives an annual rate per light from the municipality.

The cost of the new equipment, about $125,000, was paid entirely by the company. This equipment included 10- and 12-foot Sheridan Hollowspun concrete standards, with cast aluminum fixtures and Form 33 Novalux units with medium alabaster rippled glass globes and metal canopies. The alabaster glass cuts down glare that is objectionable on residential streets and blinding to drivers.

When a large number of lights were placed in a section series circuits were used, fed by series moving-coil transformers and controlled by time switches with astronomical dials. Most small installations were fed from the overhead series circuit through a small type S. L. transformer, or from the overhead multiple circuits and controlled from the series circuit by a series multiple relay.

Cable is rubber insulated with fiber and jute covering. For series circuits one-conductor No. 8 3,000-volt and one-conductor No. 8 6,000-volt cable was used. Usually this was laid in the grass-plot against the sidewalk, 12 inches deep, and on 40-foot streets the lights were staggered 135 to 150 feet apart.

The 986 gas street lights were rated at 60 candlepower and cost the city $29 a year each, so that the annual gas street-lighting bill was $28,594 for a total of 59,160 candlepower.

The New Lighting

The new lights consist of 536 ornamental standards of 100 candlepower (1,000 lumens), at $32.50 a year, which costs the city $17,420 for 53,600 candlepower; 185 mast-arm standards of 600 candlepower (6,000 lumens) at $50 a year costing $9,250 for 111,000 candlepower; and 103 gooseneck standards of 100 candlepower (1,000 lumens) at $18 a year, or $1,854 for 10,000 candlepower. Increased candlepower allowed a single mast-arm standard to replace as many as three gas lights, and two gas lights were sometimes replaced by a single ornamental type electric installation.

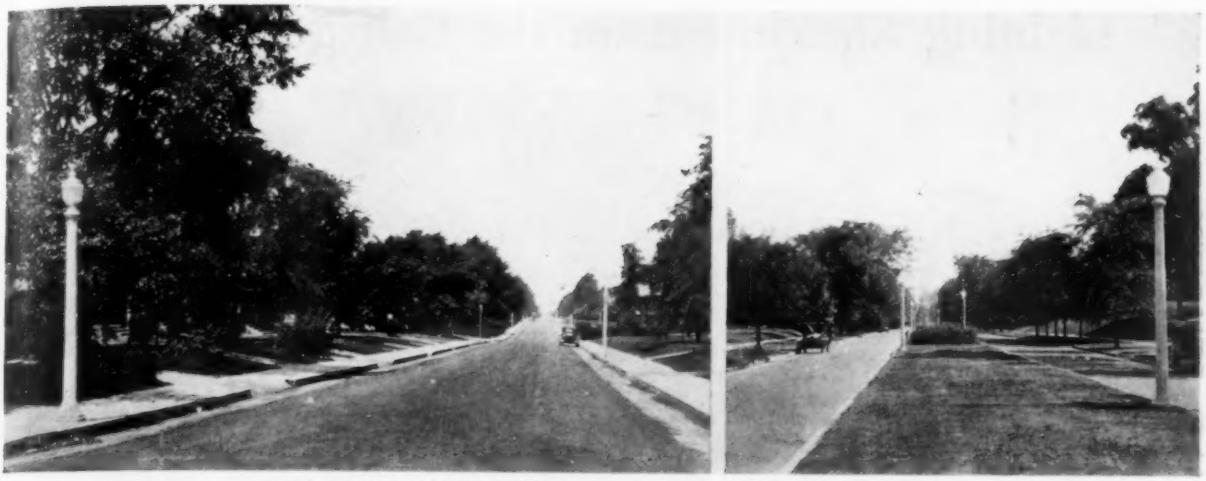
At the same time the power and light company reduced the rate on 342 other 100 candlepower ornamental lights from $35 a year to $32.50 and on 43 other 100 candlepower goosenecks the rate was reduced from $20 a year to $18.

In this manner the negotiations between the writer and the Memphis Power & Light Co. resulted in 97,660 candlepower costing $41,424 annually, being replaced by 213,400 candlepower at $40,413 annually.

Many Districts Affected

Most of the gas lights remaining in Memphis six months ago were scattered widely in almost all parts of the city, though there was some concentration in

ANOTHER SUPERSEDED TYPE



NEW ELECTRIC LIGHTING EQUIPMENT ON TWO STREETS IN MEMPHIS

STONEWALL STREET AT OVERTON PARK AVENUE

downtown alleys, and on a few residential streets. In connection with the change-over, power pole lines were removed from the downtown alleys, the new electric street lights were bracketed to buildings and the current was taken from the underground system. At the same time 202 lights were added in unlighted areas of the city, outside of the change-over agreement with the company.

Completion of the modernization of the street-lighting system is one of the projects of Mayor S. Watkins Overton, 36-year-old chief executive of this city of 253,143 inhabitants. Mayor Overton directed that this work begin with the opening of the municipal unemployment relief program of last winter, and it was one of the first pieces of construction to give definite aid. Employees for the construction crews were carefully selected from married men with largest families who had registered for work in the city-wide registration that opened the relief work.

Other Types

As shown in the list of streets of greatest illumination from street lamps, for cities of more than a quarter-million inhabitants, in THE AMERICAN CITY for March, 1931, the greatest intensity of street lighting in Memphis is on Union Avenue from Hernando to Myrtle, a distance of 3,850 feet. Tall concrete posts, with a 30-inch arm projecting over the pavement, are used, each carrying a pendent 9,500-lumen, 500-watt Line Material Co. unit, with reflector, 23 feet above the street level. The standards are placed opposite one another, at an average interval of 183 feet along the street. This lighting installation, which was made in 1924, was, like various others in the downtown section, financed by charging the total cost against the abutting property on a front-foot basis under a special lighting assessment act. The annual cost is met by the city.

Elsewhere in the downtown district ornamental bracket-type lamps on trolley poles are used where the latter are present. Where no trolley poles are available metal standards are used. Form 9 Novalux units are largely employed downtown.

LIGHTING ON UNION AVENUE, AT FOREST PARK

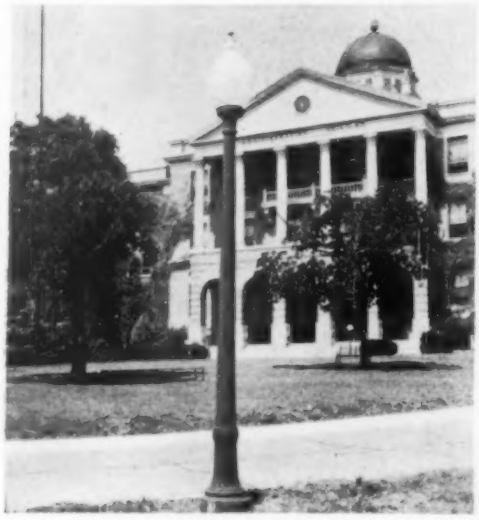
In the residential district the upright units on concrete posts, described above and illustrated herewith, and also some mast-arm lamps, are used.

Lighted Bowling Greens on Pacific Coast

IN Bellingham, Wash., according to the National Recreation Association, lighted bowling green on which people play as late as midnight have been very popular. The cost of installation was $400 for two 200-watt lights. Through the bowling greens it has been possible to reach the middle-aged man to whom other sports do not appeal. Bowling clubs have been organized which regulate periods of play. As many as 64 individuals can bowl at one time. Vancouver has eight lighted bowling greens with clubs formed on each green. These clubs contribute to the cost of construction and lighting and they also take care of the greens. Bowling in Vancouver brings out more people and creates more of a family spirit than any other sport.

In Portland, Ore., the provision of lights has been a great boon in connection with evening pageants. The Bureau of Parks has four portable floodlights erected on posts. These are carried to and from the different playgrounds and placed at convenient locations among the trees to illuminate the areas for night play.

Lighting Equipment on the College Campus



COLLEGE OF INDUSTRIAL ARTS, DENTON, TEXAS

DARTMOUTH COLLEGE, HANOVER, N. H.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

GIRARD COLLEGE, PHILADELPHIA, PA.

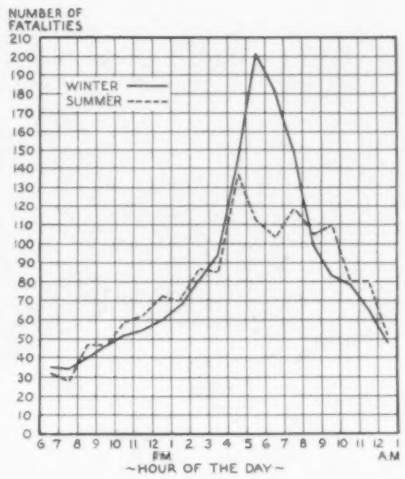
Photographs by courtesy of Union Metal Manufacturing Co.
UNIVERSITY OF MINNESOTA, MINNEAPOLIS

TUFTS COLLEGE, MEDFORD, MASS.

Early Darkness Increases Accident Peak

THE accompanying chart from "Accident Facts—1931," recently published by the National Safety Council, is significant from the standpoint of street lighting in relation to motor-vehicle fatalities. It indicates a marked difference between winter and summer in the hourly distribution of automobile deaths. As pointed out in the booklet, "The important change comes in those early evening hours when it is still light in summer but is dark in winter. During the time when it is light or dark in both seasons the number of deaths is roughly the same.

"The data in this figure cover only four states, but the 1929 automobile death total included is 8,430, or 27 per cent of the total for the entire United States. With this large sample, the conclusion is justified that lack of adequate illumination results in a large increase in motor-vehicle deaths."



In another portion of the booklet where some of the factors influencing traffic accidents are briefiy discussed, for a group of cities and states with about 45,000,000 population, the following statement regarding "Light Condition" indicates that accidents after dusk tend to be more serious than in daytime:

"Fifty-nine per cent of the accidents occurred in daylight, 37 per cent in darkness, and 5 per cent in dusk. There are important differences, however, in the non-fatal and fatal experience. While daylight was reported for 59 per cent of the non-fatal injuries, only 52 per cent of the fatal accidents occurred during these hours. The situation was reversed for the other two items—the non-fatal injuries occurring 36 per cent in darkness and 5 per cent in dusk, whereas the fatal injuries showed 42 per cent in darkness and 7 per cent in dusk."

New Lighting Studios Established

AT the Cleveland works of the Westinghouse Electric and Manufacturing Company, where that corporation's lighting activities are centered, there have recently been opened the Westinghouse Lighting Studios, including an exterior lighting studio, an interior lighting studio, and a mobile color lighting studio. In these are displayed the latest developments in street, airport, flood, commercial, industrial and mobile color lighting equipment, including systems of control equipment in actual operation. Supplementing the educational features of the studios are the experimental engineering department, outdoor and indoor laboratories, and the photometric laboratories of the Westinghouse Lighting Section, the manager of which is L. A. S. Wood.

The luminaires displayed are operated separately from control panels on the rostrum in in each studio and also by individual switches at the various units.

WESTINGHOUSE EXTERIOR LIGHTING STUDIO

The Lights of a Distant City of the North

STOCKHOLM, SWEDEN, AT NIGHT

G-E composite traffic controller. Mounting shelf lowered out of box to provide complete accessibility of timer for cycle adjustment or inspection

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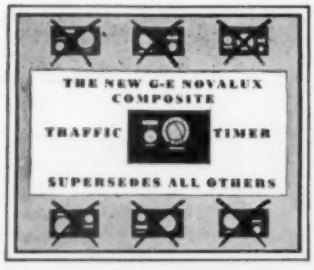
No matter how often the flow of traffic may change in direction or volume in an interconnected area, the *triple reset feature* swings the signals over to synchronized or staggered or progressive control—at any selected speed—at the flick of a switch. This feature is also available for automatic operation from a central panel.

In residential or outlying districts where heavy traffic must now be controlled at certain intersections, the *composite* controller is exactly suited for to-day's conditions. On increasingly important arteries, the same timers can be kept in step with one another and with those in the interconnected area. With the advent of cable interconnection, the same timers will be ready to step into the new system.



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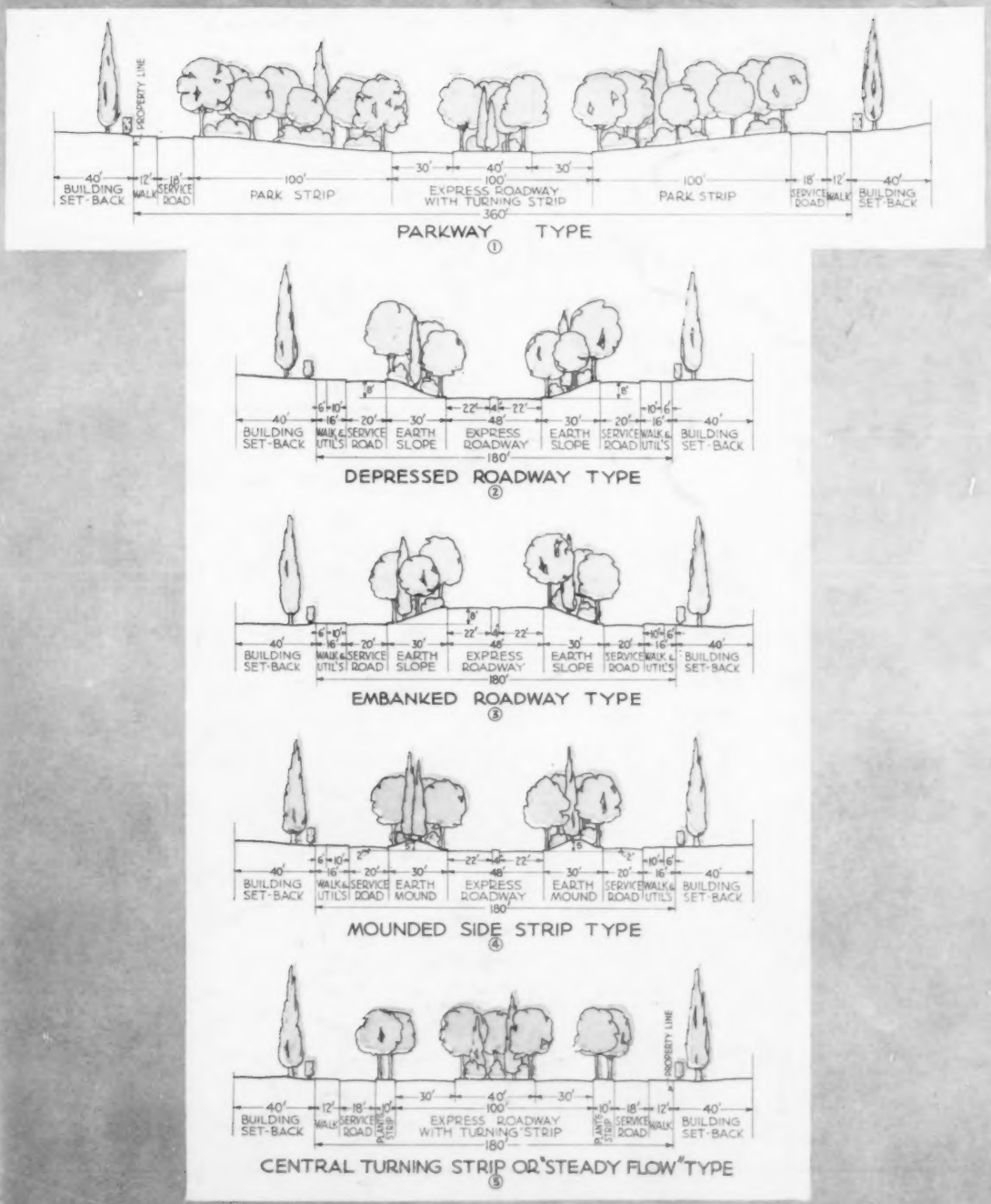

Typical Cross-Sections for Expressways Through Metropolitan Residence Areas

Robert Whitten, City Planning Consultant, New York City